

GenCore version 5.1.6
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OM protein - protein search, using sw model

Run on: February 14, 2005, 14:48:56 ; Search time 172 Seconds
(without alignments)
1466.092 Million cell updates/sec

Title: US-10-614-076-98

Perfect score: 3406

Sequence: 1 MNPNNRSEHTTKVTPNSL.....SPVSNKIYDKIEIPVQL 652

Scoring table: BLOSUM62

Gapop 10.0 , Gapext 0.5

Searched: 2105692 seqs, 386760381 residues

Total number of hits satisfying chosen parameters: 2105692

Minimum DB seq length: 0

Maximum DB seq length: 200000000

Post-processing: Minimum Match 0%

Maximum Match 100%

Listing first 150 summaries

Database : A_Geneseq_16Dec04:*

1: Geneseq1980s:*

2: Geneseq1990s:*

3: Geneseq2000s:*

4: Geneseq2001s:*

5: Geneseq2002s:*

6: Geneseq2003as:*

7: Geneseq2003bs:*

8: Geneseq2004s:*

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

Result No.	Score	Query Match	Length	ID	Description
1	3406	100.0	652	AA14047	Aar14047 B.thuring
2	3406	100.0	652	AA14047	Aar14047 B.thuring
3	3406	100.0	652	AA14047	Aar14047 B.thuring
4	3406	100.0	652	AA14047	Aar14047 B.thuring
5	3406	100.0	652	AA14047	Aar14047 B.thuring
6	3406	100.0	652	AA14047	Aar14047 B.thuring
7	3406	100.0	652	AA14047	Aar14047 B.thuring
8	3406	100.0	652	AA14047	Aar14047 B.thuring
9	3401	99.9	652	AA14047	Aar14047 B.thuring
10	3401	99.9	652	AA14047	Aar14047 B.thuring
11	3401	99.9	652	AA14047	Aar14047 B.thuring
12	3401	99.9	652	AA14047	Aar14047 B.thuring
13	3400	99.8	652	AA14047	Aar14047 B.thuring
14	3400	99.8	652	AA14047	Aar14047 B.thuring
15	3399	99.8	652	AA14047	Aar14047 B.thuring
16	3399	99.8	652	AA14047	Aar14047 B.thuring
17	3398	99.8	652	AA14047	Aar14047 B.thuring
18	3398	99.8	652	AA14047	Aar14047 B.thuring
19	3398	99.8	652	AA14047	Aar14047 B.thuring
20	3396	99.7	652	AA14047	Aar14047 B.thuring
21	3396	99.7	652	AA14047	Aar14047 B.thuring
22	3395	99.7	652	AA14047	Aar14047 B.thuring
23	3395	99.7	652	AA14047	Aar14047 B.thuring
24	3393	99.6	652	AA14047	Aar14047 B.thuring
25	3393	99.6	652	AA14047	Aar14047 B.thuring

26	3392	99.6	652	AA14047	Aar14047 B.thuring
27	3392	99.6	652	AA14047	Aar14047 B.thuring
28	3392	99.6	652	AA14047	Aar14047 B.thuring
29	3390	99.5	652	AA14047	Aar14047 B.thuring
30	3390	99.5	652	AA14047	Aar14047 B.thuring
31	3389	99.5	652	AA14047	Aar14047 B.thuring
32	3387.5	99.5	651	AA14047	Aar14047 B.thuring
33	3387	99.4	652	AA14047	Aar14047 B.thuring
34	3386	99.4	652	AA14047	Aar14047 B.thuring
35	3386	99.4	652	AA14047	Aar14047 B.thuring
36	3385	99.4	652	AA14047	Aar14047 B.thuring
37	3382	99.3	652	AA14047	Aar14047 B.thuring
38	3380	99.2	652	AA14047	Aar14047 B.thuring
39	3380	99.2	652	AA14047	Aar14047 B.thuring
40	3379	99.2	652	AA14047	Aar14047 B.thuring
41	3377	99.1	652	AA14047	Aar14047 B.thuring
42	3377	99.1	653	AA14047	Aar14047 B.thuring
43	3377	99.1	653	AA14047	Aar14047 B.thuring
44	3377	99.1	653	AA14047	Aar14047 B.thuring
45	3377	99.1	653	AA14047	Aar14047 B.thuring
46	3377	99.1	653	AA14047	Aar14047 B.thuring
47	3375	99.1	652	AA14047	Aar14047 B.thuring
48	3373	99.0	653	AA14047	Aar14047 B.thuring
49	3373	99.0	653	AA14047	Aar14047 B.thuring
50	3373	99.0	653	AA14047	Aar14047 B.thuring
51	3373	99.0	653	AA14047	Aar14047 B.thuring
52	3366.5	98.8	651	AA14047	Aar14047 B.thuring
53	3366	98.8	653	AA14047	Aar14047 B.thuring
54	3366	98.8	653	AA14047	Aar14047 B.thuring
55	3366	98.8	653	AA14047	Aar14047 B.thuring
56	3366	98.8	653	AA14047	Aar14047 B.thuring
57	3364	98.8	652	AA14047	Aar14047 B.thuring
58	3361	98.7	652	AA14047	Aar14047 B.thuring
59	3361	98.7	652	AA14047	Aar14047 B.thuring
60	3361	98.7	652	AA14047	Aar14047 B.thuring
61	3361	98.7	652	AA14047	Aar14047 B.thuring
62	3358.5	98.6	651	AA14047	Aar14047 B.thuring
63	3358	98.6	651	AA14047	Aar14047 B.thuring
64	3358	98.6	651	AA14047	Aar14047 B.thuring
65	3358	98.6	651	AA14047	Aar14047 B.thuring
66	3358	98.6	651	AA14047	Aar14047 B.thuring
67	3358	98.6	651	AA14047	Aar14047 B.thuring
68	3358	98.6	651	AA14047	Aar14047 B.thuring
69	3358	98.6	651	AA14047	Aar14047 B.thuring
70	3358	98.6	651	AA14047	Aar14047 B.thuring
71	3358	98.6	651	AA14047	Aar14047 B.thuring
72	3358	98.6	651	AA14047	Aar14047 B.thuring
73	3358	98.6	651	AA14047	Aar14047 B.thuring
74	3358	98.6	651	AA14047	Aar14047 B.thuring
75	3358	98.6	651	AA14047	Aar14047 B.thuring
76	3358	98.6	651	AA14047	Aar14047 B.thuring
77	3358	98.6	651	AA14047	Aar14047 B.thuring
78	3358	98.6	651	AA14047	Aar14047 B.thuring
79	3358	98.6	651	AA14047	Aar14047 B.thuring
80	3358	98.6	651	AA14047	Aar14047 B.thuring
81	3358	98.6	651	AA14047	Aar14047 B.thuring
82	3358	98.6	651	AA14047	Aar14047 B.thuring
83	3358	98.6	651	AA14047	Aar14047 B.thuring
84	3358	98.6	651	AA14047	Aar14047 B.thuring
85	3358	98.6	651	AA14047	Aar14047 B.thuring
86	3358	98.6	651	AA14047	Aar14047 B.thuring
87	3358	98.6	651	AA14047	Aar14047 B.thuring
88	3358	98.6	651	AA14047	Aar14047 B.thuring
89	3358	98.6	651	AA14047	Aar14047 B.thuring
90	3358	98.6	651	AA14047	Aar14047 B.thuring
91	3358	98.6	651	AA14047	Aar14047 B.thuring
92	3358	98.6	651	AA14047	Aar14047 B.thuring
93	3358	98.6	651	AA14047	Aar14047 B.thuring
94	3358	98.6	651	AA14047	Aar14047 B.thuring
95	3358	98.6	651	AA14047	Aar14047 B.thuring
96	3358	98.6	651	AA14047	Aar14047 B.thuring
97	3358	98.6	651	AA14047	Aar14047 B.thuring
98	3358	98.6	651	AA14047	Aar14047 B.thuring

Tue Feb 15 13:16:09 2005

99	2336.5	68.6	644	2	AAW34812	Novel Cry
100	2335.5	68.6	644	2	AAW34821	Novel Cry
101	2335.5	68.6	644	2	AAW34825	Novel Cry
102	2335.5	68.6	644	2	AAW34826	Novel Cry
103	2335.5	68.6	644	2	AAW34840	Novel Cry
104	2335.5	68.6	644	2	AAW34818	Novel Cry
105	2335.5	68.6	644	2	AAW34813	Novel Cry
106	2333.5	68.5	644	2	AAW34816	Novel Cry
107	2333.5	68.5	644	2	AAW34815	Novel Cry
108	2333.5	68.5	644	2	AAW34833	Novel Cry
109	2333.5	68.5	644	2	AAW34837	Novel Cry
110	2333.5	68.5	644	2	AAW34824	Novel Cry
111	2332.5	68.5	644	2	AAW34837	Novel Cry
112	2332.5	68.5	644	2	AAW34811	Novel Cry
113	2332.5	68.5	644	2	AAW34811	Novel Cry
114	2327.5	68.3	644	2	AAW34819	Novel Cry
115	2312.5	67.9	644	6	AAW34784	Novel Cry
116	2283.5	67.0	644	4	AAW34784	Novel Cry
117	2269.5	66.6	645	2	AAW34784	Novel Cry
118	2165	63.6	606	6	ABP72641	Novel Cry
119	2152	63.2	649	2	AAW15630	Btl109P i
120	2152	63.2	649	2	AAW23210	Amino aci
121	2138.5	62.8	597	2	AAW00334	Bacillus
122	2138.5	62.8	597	2	AAW69666	Wild-type
123	2138.5	62.8	597	6	ABP72638	Cry3A Tox
124	2137.5	62.8	610	2	AAW05537	Synthetic
125	2137.5	62.8	610	2	AAW00333	Bacillus
126	2137.5	62.8	610	2	ADG25144	Codon opt
127	2137.5	62.8	610	3	AAW69667	Bacillus
128	2135.5	62.7	610	2	AAW85482	Btt synth
129	2133.5	62.5	597	6	ABP72642	Modified
130	2129.5	62.5	601	6	ABP72640	Modified
131	2125	62.2	598	6	ABP72646	Modified
132	2120	62.2	597	6	ABP72645	Modified
133	2116	62.1	602	6	ABP72639	Modified
134	2115	62.1	596	6	AAW15784	B.thuring
135	2108.5	61.9	956	2	AAW15783	B.thuring
136	2108.5	61.9	1100	2	AAW15783	B.thuring
137	2106	61.8	1000	6	ABP72644	Modified
138	2078.5	61.0	914	2	AAW15785	B.thuring
139	1809	53.1	347	2	AAW15631	Bacillus
140	1272.5	37.4	1167	5	AAW08281	B.t.t. co
141	1233.5	36.2	300	2	AAW99959	B.thuring
142	1215	35.7	675	8	ADL15377	B.thuring
143	1214	35.6	675	8	ADL15345	Bacillus
144	1212.5	35.6	670	5	AAU99273	Bacillus
145	1211	35.6	673	5	AAU99265	Bacillus
146	1210.5	35.5	670	5	AAU99266	Bacillus
147	1210	35.5	673	5	AAU99271	B.thuring
148	1209.5	35.5	676	8	ADL15375	B.thuring
149	1208.5	35.5	674	8	ADL15385	B.thuring
150	1208.5	35.5	676	8	ADL15343	B.thuring

ALIGNMENTS

RESULT 1
AAW14047 standard; protein; 652 AA.

XX	AAW14047;	
XX	AAW14047;	
XX	25-MAR-2003 (revised)	
DT	07-JAN-1992 (first entry)	
XX	B.thuringiensis CryIIC insecticidal protein.	
DE	insecticide; corn rootworm toxicity.	
KW	Bacillus thuringiensis.	
OS	WO9114778-A.	
PN		

XX	03-OCT-1991.	
PD	20-MAR-1990; 90US-00496568.	
XX	20-MAR-1990; 90US-00496568.	
PR	(ECOG-) ECOGEN INC.	
PA	Donovan WP, Rupar WJ, Slaney AC, Johnson TB;	
XX	WPI; 1991-310578/42.	
PI	N-PSDB; AAQ14098.	
DR	New bacillus thuringiensis cryIIIC gene - encoding protein with toxicity to Coleoptera insects.	
XX	Claim 4; Fig 1; 79pp; English.	
PS	The cryIIC gene was isolated from a B.thuringiensis strain BG4961	
CC	library in pUC18. Screening was by a cryIIB Gene probe. One positive	
CC	colony was subcloned and sequenced. It contained an 8.3kb fragment whose	
CC	ORF was deduced to encode a protein of mol. wt. 74393 Daltons. The	
CC	protein (designated CryIIIC) has enhanced corn rootworm toxicity compared	
CC	to known proteins CryIIIA and CryIIB. The following amino acid residues	
CC	are thought to be significant for this toxicity: His9, His231, Gln339,	
CC	Phe352, Asn446, His449, Val450, Ser451, Lys600 and Lys624. The toxic	
CC	protein can be used in an insecticide composition. Insecticidal activity	
CC	can be enhanced by addition of CryI to the composition. (Updated on 25-	
CC	MAR-2003 to correct PI field.)	
XX	Sequence 652 AA;	
SQ	Query Match 100.0%; Score 3406; DB 2; Length 652;	
	Best Local Similarity 100.0%; Pred. No. 7.4e-277;	
	Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;	
QY	1 MNPNNRSHDTIKVTPNSELTQNHQYPLADNPSTLEELNYKEFLMTEDSSTVELDNS 60	
Db	1 MNPNNRSHDTIKVTPNSELTQNHQYPLADNPSTLEELNYKEFLMTEDSSTVELDNS 60	
QY	61 TVKDAVGTSISVVGQILGVGVFPAGALTSFYQSFLNTWPSDADPWKAPMAQVEVLIDK 120	
Db	61 TVKDAVGTSISVVGQILGVGVFPAGALTSFYQSFLNTWPSDADPWKAPMAQVEVLIDK 120	
QY	121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRFLFSQAESHFRN 180	
Db	121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRFLFSQAESHFRN 180	
QY	181 SMPSPAVSKFEVLFTPTVAQAANTHLLLLKDAQVGEWGYSSSDVAFYHRLKLTQY 240	
Db	181 SMPSPAVSKFEVLFTPTVAQAANTHLLLLKDAQVGEWGYSSSDVAFYHRLKLTQY 240	
QY	241 TDHCNVNMYNVLNGLRGSTYDAWKFNFRRREMTITVLDLIVLFFPYDIRLSKGVKTLEL 300	
Db	241 TDHCNVNMYNVLNGLRGSTYDAWKFNFRRREMTITVLDLIVLFFPYDIRLSKGVKTLEL 300	
QY	301 TRDIFDPTFSLNTLQYGTFTLSIENSRKPHLFDYLGQIEFHTRLPQGYFGKDSFNW 360	
Db	301 TRDIFDPTFSLNTLQYGTFTLSIENSRKPHLFDYLGQIEFHTRLPQGYFGKDSFNW 360	
QY	361 SGNVETRPSIGSKTITSPFYGDKSTPEVKQLSFDGQKVKYRTIANTDVAAMPNGKVIYG 420	
Db	361 SGNVETRPSIGSKTITSPFYGDKSTPEVKQLSFDGQKVKYRTIANTDVAAMPNGKVIYG 420	
QY	421 VTKVDFSOYDDOKNETSTQYDSKRNGHVSADSIDQLPPTETDPLEKAYSHQNLNAYE 480	
Db	421 VTKVDFSOYDDOKNETSTQYDSKRNGHVSADSIDQLPPTETDPLEKAYSHQNLNAYE 480	
QY	481 CFLMDQRRGTIPFFTWTHRSVDFNTTDAEKITOLPVVKAYALSASGSIIEGFGFTGNNL 540	
Db	481 CFLMDQRRGTIPFFTWTHRSVDFNTTDAEKITOLPVVKAYALSASGSIIEGFGFTGNNL 540	

QY 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTNLRLLFVQNSNDDFLVIYINKTMNK 600
DB 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTNLRLLFVQNSNDDFLVIYINKTMNK 600
QY 601 DDLLTYQTFDLATNSNMFGSGDKNELIIGAESFVSNKIIYIDKIEFIPVOL 652
DB 601 DDLLTYQTFDLATNSNMFGSGDKNELIIGAESFVSNKIIYIDKIEFIPVOL 652

RESULT 2

AAV23207
ID AAY23207 standard; protein; 652 AA.
XX
AC AAY23207;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of the wild type cry3Bb protein.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Bruesock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
XX
PS Disclosure; Page 480-482; 512pp; English.
XX
XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 100.0%; Score 3406; DB 2; Length 652;
Best Local Similarity 100.0%; Pred. No. 7.4e-277;
Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTNPSELQTNHNQYPLADNPSTLEELNYKEFLRMTEDSSSTEVLDS 60

DB 1 MNPNNRSEHDTIKVTNPSELQTNHNQYPLADNPSTLEELNYKEFLRMTEDSSSTEVLDS 60
QY 61 TVKDVGTCIGSVVGGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAPMAQVEVLIDK 120
DB 61 TVKDVGTCIGSVVGGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAPMAQVEVLIDK 120
QY 121 KIEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDQRIRELFSQAESHFRN 180
DB 121 KIEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDQRIRELFSQAESHFRN 180
QY 181 SMPSPAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSSEDVAEPHRLKLTQQY 240
DB 181 SMPSPAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSSEDVAEPHRLKLTQQY 240
QY 241 TDHCNVNMYNGLNGLRGSTYDAWKENRRFRREMTLVLDLIVLFPYDRLYKSGVKTEL 300
DB 241 TDHCNVNMYNGLNGLRGSTYDAWKENRRFRREMTLVLDLIVLFPYDRLYKSGVKTEL 300
QY 301 TRDIFTDPIFSLNTLQEGYGTFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360
DB 301 TRDIFTDPIFSLNTLQEGYGTFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360
QY 361 SGNVETREPSIGSSKTIITSPFYGDKSTEPVKLSFDGQKVYRTIANTDVAAMPNGKVYLG 420
DB 361 SGNVETREPSIGSSKTIITSPFYGDKSTEPVKLSFDGQKVYRTIANTDVAAMPNGKVYLG 420
QY 421 VTKVDFSQYDDQKNETSTQTYDSKRNGHVSAQDSIDQLPETTDEPLEKAYSHQLNYAE 480
DB 421 VTKVDFSQYDDQKNETSTQTYDSKRNGHVSAQDSIDQLPETTDEPLEKAYSHQLNYAE 480
QY 481 CFLMQDRRGCTIPFFTWTHRSVDFNTIDAEKITQLPVPVKAYALSSGASIEGPGFTGGNL 540
DB 481 CFLMQDRRGCTIPFFTWTHRSVDFNTIDAEKITQLPVPVKAYALSSGASIEGPGFTGGNL 540
QY 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTNLRLLFVQNSNDDFLVIYINKTMNK 600
DB 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTNLRLLFVQNSNDDFLVIYINKTMNK 600
QY 601 DDLLTYQTFDLATNSNMFGSGDKNELIIGAESFVSNKIIYIDKIEFIPVOL 652
DB 601 DDLLTYQTFDLATNSNMFGSGDKNELIIGAESFVSNKIIYIDKIEFIPVOL 652

RESULT 3
AAV23212
ID AAY23212 standard; protein; 652 AA.
XX
AC AAY23212;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb protein.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm; Cry3BB;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.

(MONS) MONSANTO CO.
English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA,
Walters FS, Slatin SL, Von Tersch MA, Romano C;
WPI; 1999-395184/33.
Insecticidal Bacillus thuringiensis proteins.
Disclosure; Page 500-502; 512pp; English.
The present sequence represents the Cry3Bb protein. The specification describes new Bacillus thuringiensis Cry3Bb mutant proteins, and provides methods for producing them. The B. thuringiensis Cry3Bb polypeptide was modified to have improved insecticidal activity or enhanced insecticidal specificity against a target insect. The modification comprises at least one amino acid substitution, addition, or deletion in the primary sequence of the native or unmodified Cry3Bb polypeptide, wherein the substitution or deletion occurs at a position corresponding to from about amino acids 1-365 of the unmodified polypeptide sequence (AA23207 represents the wild type Cry3Bb protein). The polypeptide can be used to kill coleopteran pests, especially by application to the environment. It is especially useful against southern corn rootworm and western corn root worm, (Diabrotica undecimpunctata howardi Barber, and Diabrotica virgifera virgifera LeConte respectively). The mutant cry3Bb polynucleotides can also be used to produce transgenic plants with increased insecticide resistance
SQ Sequence 652 AA;
Query Match 100.0%; Score 3406; DB 2; Length 652;
Best Local Similarity 100.0%; Pred. No. 7.4e-277;
Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTENSELQTNHNYPLADPNSTLEELNYKEFLRMTEDSSTEVLDS 60
DB 1 MNPNNRSEHDTIKVTENSELQTNHNYPLADPNSTLEELNYKEFLRMTEDSSTEVLDS 60
QY 61 TVKDAVGTGISVVGQILGVVGPFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDAVGTGISVVGQILGVVGPFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEVAKSKALAELOGLQNNFEDYNALNSWKKTPLSLRSKRSQDRIRSELFQAESHFN 180
DB 121 KIEEVAKSKALAELOGLQNNFEDYNALNSWKKTPLSLRSKRSQDRIRSELFQAESHFN 180
QY 181 SMPFAVSKFEVLFLPTTAAQANTHLLKDAQVFGEEWGYSEDVAEYFHRQLKLTQY 240
DB 181 SMPFAVSKFEVLFLPTTAAQANTHLLKDAQVFGEEWGYSEDVAEYFHRQLKLTQY 240
QY 241 TDHCNVNNGVGLRGSTYDAWKFNRRREMTLTVLDLIVLPPYDIRLYSKGVKTEL 300
DB 241 TDHCNVNNGVGLRGSTYDAWKFNRRREMTLTVLDLIVLPPYDIRLYSKGVKTEL 300
QY 301 TRDIFDTPISLNTLOEYGTFLSIENSIRKPHLFDYLOQIEPHTRLOPGYFGKDSFNW 360
DB 301 TRDIFDTPISLNTLOEYGTFLSIENSIRKPHLFDYLOQIEPHTRLOPGYFGKDSFNW 360
QY 361 SGNYVTRPSIGSKTITSPFYGDKSTPEVKLSFDGQKYRTIANTDVAAWPNKGYL 420
DB 361 SGNYVTRPSIGSKTITSPFYGDKSTPEVKLSFDGQKYRTIANTDVAAWPNKGYL 420
QY 421 VTKVDSOYDQKNESTQYDSKRNGHVSADSIDLPPETTDPLEKAYSHQLNYAE 480
DB 421 VTKVDSOYDQKNESTQYDSKRNGHVSADSIDLPPETTDPLEKAYSHQLNYAE 480
QY 481 CFLMQDRRGITPFFTTHRSVDFNTIDAESKITQLPVKAYALSSGASIEGPGFTGML 540
DB 481 CFLMQDRRGITPFFTTHRSVDFNTIDAESKITQLPVKAYALSSGASIEGPGFTGML 540
QY 541 LFLKESNSIAKPKVLNSAALLQRYVRIRYASTTNLRLFVQNSNNDLVIYINKTMNK 600
DB 541 LFLKESNSIAKPKVLNSAALLQRYVRIRYASTTNLRLFVQNSNNDLVIYINKTMNK 600

QY 601 DDDLTYYOTFDLATTNSNMGFGDKNELIIGAESFVSNEKIYIDKIERIPVOL 652
DB 601 DDDLTYYOTFDLATTNSNMGFGDKNELIIGAESFVSNEKIYIDKIERIPVOL 652
RESULT 4
AA70441
ID AA70441 standard; protein; 652 AA.
XX
AC AA70441;
XX
DT 21-JUN-2000 (first entry)
XX
DE Bacillus thuringiensis delta-endotoxin, Cry3Bb1.
XX
KW delta-endotoxin; Cry3B; Cry3Bb1; Bt toxin; crystal protein; insect pest;
insecticide; Coleopteran; expression cassette; transgenic plant.
XX
OS Bacillus thuringiensis.
XX
FN WO200011185-A2.
XX
PD 02-MAR-2000.
XX
PF 19-AUG-1999; 99WO-US018883.
XX
PR 19-AUG-1998; 98US-0097150P.
XX
PA (MONS) MONSANTO CO.
XX
PI Romano CP;
XX
DR WPI: 2000-246568/21.
DR N-PSDB; AA251635.
XX
PT Novel expression cassettes which express Bacillus thuringiensis Cry3
delta-endotoxin portion which is toxic to coleopteran insect pests,
useful for producing transgenic plants with improved insecticidal
activity.
XX
PS Claim 5; Page 92-94; 171pp; English.
XX
CC The present sequence is a Bacillus thuringiensis delta-endotoxin, Cry3Bb1
which is toxic to Coleopteran insect pests. The coding sequence of this
protein is used in an expression cassette which provides improved
expression of Cry3B or Cry3B variant proteins in transgenic plants e.g.
maize. Transgenic plants expressing higher levels of Cry3B proteins
exhibit increased insecticidal activity against Coleopteran pests
XX
SQ Sequence 652 AA;
Query Match 100.0%; Score 3406; DB 3; Length 652;
Best Local Similarity 100.0%; Pred. No. 7.4e-277;
Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTENSELQTNHNYPLADPNSTLEELNYKEFLRMTEDSSTEVLDS 60
DB 1 MNPNNRSEHDTIKVTENSELQTNHNYPLADPNSTLEELNYKEFLRMTEDSSTEVLDS 60
QY 61 TVKDAVGTGISVVGQILGVVGPFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDAVGTGISVVGQILGVVGPFPAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEVAKSKALAELOGLQNNFEDYNALNSWKKTPLSLRSKRSQDRIRSELFQAESHFN 180
DB 121 KIEEVAKSKALAELOGLQNNFEDYNALNSWKKTPLSLRSKRSQDRIRSELFQAESHFN 180
QY 181 SMPFAVSKFEVLFLPTTAAQANTHLLKDAQVFGEEWGYSEDVAEYFHRQLKLTQY 240
DB 181 SMPFAVSKFEVLFLPTTAAQANTHLLKDAQVFGEEWGYSEDVAEYFHRQLKLTQY 240
QY 241 TDHCNVNNGVGLRGSTYDAWKFNRRREMTLTVLDLIVLPPYDIRLYSKGVKTEL 300

Db 241 TDHCVNMYNGLRGSTYDAWVKENFRREMTLVLDLVLFPFVDIRLYSGVKTEL 300
 Qy 301 TRDIFTPIFSLNTLOEYGTFLSIENIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360
 Db 301 TRDIFTPIFSLNTLOEYGTFLSIENIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360
 Qy 361 SGNVETRPISGSSKTIITSPFYGDKSTPEPVQKLSFDGQKVYRTIANTDVAWPNKGYLG 420
 Db 361 SGNVETRPISGSSKTIITSPFYGDKSTPEPVQKLSFDGQKVYRTIANTDVAWPNKGYLG 420
 Qy 421 VTKVDFSYDDQKNETSTQTYDSKRNGHVSQAODSIDQLPPETDDEPLEKAYSHQLNYAE 480
 Db 421 VTKVDFSYDDQKNETSTQTYDSKRNGHVSQAODSIDQLPPETDDEPLEKAYSHQLNYAE 480
 Qy 481 CFLMDQRRTGTPFTTWTHTRSVDFNTDAEKITOLPVVKAYALSSGASIIIEGPGFTGNNL 540
 Db 481 CFLMDQRRTGTPFTTWTHTRSVDFNTDAEKITOLPVVKAYALSSGASIIIEGPGFTGNNL 540
 Qy 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 Db 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 Qy 601 DDLTYQTDFLATNMGFSGDKNELIIGAESFVSNKIIYIDKIFIPVOL 652
 Db 601 DDLTYQTDFLATNMGFSGDKNELIIGAESFVSNKIIYIDKIFIPVOL 652
 RESULT 5
 ABU09192
 ID ABU09192 standard; protein; 652 AA.
 XX AC ABU09192;
 XX DT 12-JUN-2003 (first entry)
 XX DE Bacillus thuringiensis delta endotoxin Cry3Bb1.
 XX KW Cry3Bb1; delta-endotoxin; plant; transgenic; insecticide; crystal 3;
 KW Cry3; Coleopteran insect infestation; increased toxicity;
 KW season long protection; beetle.
 XX OS Bacillus thuringiensis.
 XX PN US6501009-B1.
 XX PD 31-DEC-2002.
 XX PF 19-AUG-1999; 99US-00377466.
 XX PR 19-AUG-1999; 99US-00377466.
 XX PA (MONS) MONSANTO TECHNOLOGY LLC.
 XX PI Romano CP;
 XX WPI: 2003-352192/33.
 XX N-PSDB; ABX95179.
 PT New modified polynucleotide useful for controlling Coleopteran insect
 PT infestation in a field of crop plants encodes insecticidal crystal 3
 PT Bacillus thuringiensis delta-endotoxin.
 XX PS Disclosure; Col 49-54; 107pp; English.
 CC The invention relates to a modified polynucleotide which encodes an
 CC insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
 CC as CryBb. The modified polynucleotide is useful for producing a
 CC transformed cell, by introducing the modified polynucleotide into a cell
 CC such as a plant cell (preferably a maize cell) or a microbial cell. The
 CC modified polynucleotide is useful for producing a transformed maize plant
 CC by introducing the modified polynucleotide into a maize plant cell,
 CC selecting a transformed maize plant cell and regenerating a maize plant

CC from the transformed maize plant cell. A transgenic plant expressing the
 CC modified polynucleotide is useful for controlling Coleopteran insect
 CC infestation in a field of crop plants. The modified polynucleotide is
 CC useful for producing transgenic plants expressing higher levels of the
 CC insect controlling B. thuringiensis delta-endotoxin. The modified
 CC polynucleotide provides up to 10 fold higher levels of insect controlling
 CC delta-endotoxin relative to the highest levels obtained using prior
 CC compositions. In particular, transgenic maize expressing higher levels of
 CC the Cry3Bb protein designed to exhibit increased toxicity toward
 CC Coleopteran pests deliver superior levels of insect protection and are
 CC less likely to sponsor development of populations of target insects that
 CC are resistant to the insecticidally active protein. Improved control of
 CC susceptible target insect pests and season long protection from insect
 CC pathogens is achieved using the modified polynucleotide. The modified
 CC polynucleotide reduces the number of transgenic events that have to be
 CC screened in order to identify one which contains beneficial levels of one
 CC or more insect controlling compositions. The present sequence represents
 CC the amino acid sequence of Bacillus thuringiensis delta endotoxin Cry3Bb1
 XX
 SX Sequence 652 AA;

Query Match 100.0%; Score 3406; DB 6; Length 652;
 Best Local Similarity 100.0%; Pred. No. 7.4e-277;
 Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 MNPNNRSEHDTIKVTPNSELOTNHNOYPLADNPSTLEELNYKEFLRMWTESSTEVLDNS 60
 Db 1 MNPNNRSEHDTIKVTPNSELOTNHNOYPLADNPSTLEELNYKEFLRMWTESSTEVLDNS 60
 Qy 61 TVKDAVGTGISVVGQILGVVGVFPFAGALTSTFYOSPLNTIWPSSDADPWKAFMAQVEVLIDK 120
 Db 61 TVKDAVGTGISVVGQILGVVGVFPFAGALTSTFYOSPLNTIWPSSDADPWKAFMAQVEVLIDK 120
 Qy 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDRIREFSOAESFRN 180
 Db 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDRIREFSOAESFRN 180
 Qy 181 SNPSFAVSFVFLFPTYAQAANTHLLKDAQVGEWGYSEDVAEFYHROLKLTQQY 240
 Db 181 SNPSFAVSFVFLFPTYAQAANTHLLKDAQVGEWGYSEDVAEFYHROLKLTQQY 240
 Qy 241 THCVNMYNGLRGSTYDAWVKENFRREMTLVLDLVLFPFVDIRLYSGVKTEL 300
 Db 241 THCVNMYNGLRGSTYDAWVKENFRREMTLVLDLVLFPFVDIRLYSGVKTEL 300
 Qy 301 TRDIFTPIFSLNTLOEYGTFLSIENIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360
 Db 301 TRDIFTPIFSLNTLOEYGTFLSIENIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360
 Qy 361 SGNVETRPISGSSKTIITSPFYGDKSTPEPVQKLSFDGQKVYRTIANTDVAWPNKGYLG 420
 Db 361 SGNVETRPISGSSKTIITSPFYGDKSTPEPVQKLSFDGQKVYRTIANTDVAWPNKGYLG 420
 Qy 421 VTKVDFSYDDQKNETSTQTYDSKRNGHVSQAODSIDQLPPETDDEPLEKAYSHQLNYAE 480
 Db 421 VTKVDFSYDDQKNETSTQTYDSKRNGHVSQAODSIDQLPPETDDEPLEKAYSHQLNYAE 480
 Qy 481 CFLMDQRRTGTPFTTWTHTRSVDFNTDAEKITOLPVVKAYALSSGASIIIEGPGFTGNNL 540
 Db 481 CFLMDQRRTGTPFTTWTHTRSVDFNTDAEKITOLPVVKAYALSSGASIIIEGPGFTGNNL 540
 Qy 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 Db 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 Qy 601 DDLTYQTDFLATNMGFSGDKNELIIGAESFVSNKIIYIDKIFIPVOL 652
 Db 601 DDLTYQTDFLATNMGFSGDKNELIIGAESFVSNKIIYIDKIFIPVOL 652

RESULT 6
 ABW01050
 ID ABW01050 standard; protein; 652 AA.

```
XX AC ABW01050;
XX DT 15-JAN-2004 (first entry)
XX DE Bacillus thuringiensis Cry3Bb1-delta-endotoxin protein.
XX KW Transgenic plant; Cry3Bb1-delta-endotoxin; Coleopteran pest resistance;
XX KW insecticide.
XX OS Bacillus thuringiensis.
XX PN US2003115630-A1.
XX PD 19-JUN-2003.
XX PF 29-AUG-2002; 2002US-00232665.
XX PR 19-AUG-1999; 99US-00377466.
XX PA (ROMA/) ROMANO C P.
XX PI Romano CP;
XX DR WPI; 2003-810928/76.
XX DR N-PSDB; AAD61783.
XX PT New transgenic plant resistant to Coleopteran pests, comprises Bacillus
XX PT thuringiensis Cry3-delta-endotoxin gene.
XX PS Claim 5; Page 28-29; Opp; English.
XX CC The invention relates to novel transgenic plants comprising Bacillus
XX CC thuringiensis Cry3-delta-endotoxin gene or its variants having
XX CC coleopteran inhibitory activity. The invention is useful for controlling
XX CC Coleopteran insect infestation in a field of crop plants. The present
XX CC sequence is B. thuringiensis Cry3Bb1-delta- endotoxin protein
XX SQ Sequence 652 AA;

Query Match 100.0%; Score 3406; DB 7; Length 652;
Best Local Similarity 100.0%; Pred. No. 7.4e-277;
Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTNSLQTHNNOYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
DB 1 MNPNNRSEHDTIKVTNSLQTHNNOYPLADNPNSTLEELNYKEFLRMTEDSSTEVLDNS 60
QY 61 TVKDVGVTGIVVGGQILGVVGVPPFAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDK 120
DB 61 TVKDVGVTGIVVGGQILGVVGVPPFAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLFQAESHPFN 180
DB 121 KIEEYAKSALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLFQAESHPFN 180
QY 181 SMPFSAVSKPEVLFLPTYAQAANTHLLKDAOVFGEWGYSSSEDAEYFVHRLKLTQY 240
DB 181 SMPFSAVSKPEVLFLPTYAQAANTHLLKDAOVFGEWGYSSSEDAEYFVHRLKLTQY 240
QY 241 TDHCVNMYNVLNGLRGSTYDAWVKFNFRREMTLVLDLIVLFPFYDIRLSKGVKTEL 300
DB 241 TDHCVNMYNVLNGLRGSTYDAWVKFNFRREMTLVLDLIVLFPFYDIRLSKGVKTEL 300
QY 301 TRDIFTDPIPSLNTLOEYGTFTLSIENSIRKPHLFDYLOGIEFHTLPOGYFGKDSFNW 360
DB 301 TRDIFTDPIPSLNTLOEYGTFTLSIENSIRKPHLFDYLOGIEFHTLPOGYFGKDSFNW 360
QY 361 SGNVETRPISGSKTITSFYGDKSTPEVKLSFDGQKVYRIANTDVAWPNKGKVLG 420
DB 361 SGNVETRPISGSKTITSFYGDKSTPEVKLSFDGQKVYRIANTDVAWPNKGKVLG 420
QY 421 VTKVDFSQYDDQKNETSTQTYDSKRNGHVSAQDSIDLQPPETTDPLEKAYSHQLNYAE 480
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DB 421 VTKVDFSQYDDQKNETSTQTYDSKRNGHVSAQDSIDLQPPETTDPLEKAYSHQLNYAE 480
QY 481 CFLMQDRRGTTIPFTWTHRSVDFNTTDAEKITQLPVVKAYALSSGASIIIEGPGFTGNNL 540
DB 481 CFLMQDRRGTTIPFTWTHRSVDFNTTDAEKITQLPVVKAYALSSGASIIIEGPGFTGNNL 540
QY 541 LFLKSSNSIAKPKVTILNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
DB 541 LFLKSSNSIAKPKVTILNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
QY 601 DDDLTYQTDFDLATTNSNMFGSDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
DB 601 DDDLTYQTDFDLATTNSNMFGSDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652

RESULT 7
ADR89425
ID ADR89425 standard; protein; 652 AA.
XX AC ADR89425;
XX DT 18-NOV-2004 (first entry)
XX DE cry3Bb.
XX KW delta-endotoxin; delta-endotoxin associate polypeptide;
XX KW expression cassette; transformation; transgenic; plant; bacteria;
XX KW lepidoptera; coleoptera; pest; pesticide; resistance;
XX KW pesticidal activity.
XX OS Bacillus thuringiensis.
XX PN WO2004074462-A2.
XX PD 02-SEP-2004.
XX PF 20-FEB-2004; 2004WO-US005829.
XX PR 20-FEB-2003; 2003US-0448632P.
XX PR 20-FEB-2003; 2003US-0448633P.
XX PR 20-FEB-2003; 2003US-0448797P.
XX PR 20-FEB-2003; 2003US-0448806P.
XX PR 20-FEB-2003; 2003US-0448810P.
XX PR 20-FEB-2003; 2003US-0448812P.
XX PR 19-FEB-2004; 2004US-00781979.
XX PR 19-FEB-2004; 2004US-00782020.
XX PR 19-FEB-2004; 2004US-00782096.
XX PR 19-FEB-2004; 2004US-00782141.
XX PR 19-FEB-2004; 2004US-00782570.
XX PR 19-FEB-2004; 2004US-00783417.
XX (ATHE-) ATHENIX CORP.
PA Carozzi N, Hargies T, Koziel MG, Duck NB, Carr B;
PI WPI; 2004-635574/61.
XX New isolated delta-endotoxin and delta-endotoxin-associated nucleic acids
XX and polypeptides, useful for killing lepidopteran or coleopteran pests or
XX for producing organisms with pesticide resistance.
XX Example 6; SEQ ID NO 37; 178pp; English.
XX This sequence represents a delta-endotoxin crystal protein. This protein
XX was included in the scope of the invention as a comparison to the delta-
XX endotoxins of the invention. Some of the delta-endotoxin coding sequences
XX of the invention have alternative start codons, producing more than one
XX protein from a single open reading frame. The nucleic acid sequences of
XX the invention are useful in DNA constructs or expression cassettes for
XX transformation and expression in plants and bacteria. The nucleic acids
XX and corresponding polypeptides are useful for killing lepidopteran or
XX coleopteran pests. Compositions containing the delta-endotoxins of the
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CC invention, and methods for their production, are useful for the
CC production of organisms with pesticide resistance, specifically bacteria
CC and plants. These organisms are useful for generating altered or improved
CC delta-endotoxin or delta-endotoxin-associated proteins that have
CC pesticidal activity, or for detecting the presence of delta-endotoxin or
CC delta-endotoxin-associated proteins or nucleic acids in products or
CC organisms.
XX
SQ Sequence 652 AA;

Query Match 100.0%; Score 3406; DB 8; Length 652;
Best Local Similarity 100.0%; Pred. No. 7.4e-277;
Matches 652; Conservative 0; Mismatches 0; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLNDS 60
DB 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLNDS 60
QY 61 TVKDVGTSVVGQILGVVGVPPFAGALTSFYQSFLNTIWPSDADPWKAPMAQVEVLIDK 120
DB 61 TVKDVGTSVVGQILGVVGVPPFAGALTSFYQSFLNTIWPSDADPWKAPMAQVEVLIDK 120
QY 121 KIEEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
DB 121 KIEEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
QY 181 SMPFSAVSKFEVLFLPTYAQAANTHLLKDAQVFGEEWGYSSYEDVAEFVHRLKLTQOY 240
DB 181 SMPFSAVSKFEVLFLPTYAQAANTHLLKDAQVFGEEWGYSSYEDVAEFVHRLKLTQOY 240
QY 241 TDHCVMNMYNGLNGLRGSTYDAWKFNRRFMTLTVDLIVLFFPYDIRLYSGVKTEL 300
DB 241 TDHCVMNMYNGLNGLRGSTYDAWKFNRRFMTLTVDLIVLFFPYDIRLYSGVKTEL 300
QY 301 TRDIFTDPFSLNTLOEYGTFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360
DB 301 TRDIFTDPFSLNTLOEYGTFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360
QY 361 SGNVETRPISGSKTITSFYGDKSTEPVKLSFDGQKVYRTIANTDVAWPNKGKYL 420
DB 361 SGNVETRPISGSKTITSFYGDKSTEPVKLSFDGQKVYRTIANTDVAWPNKGKYL 420
QY 421 VTKVDFSQYDQKNETSTQYDSCRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQLNYAE 480
DB 421 VTKVDFSQYDQKNETSTQYDSCRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQLNYAE 480
QY 481 CFLMQDRGTHPIPTTTHRSVDFNTIDAKITOLPVKAYALSSGASIIIEGPGFTGGNL 540
DB 481 CFLMQDRGTHPIPTTTHRSVDFNTIDAKITOLPVKAYALSSGASIIIEGPGFTGGNL 540
QY 541 LFLKESNSIAKFKVLNLSAALLQRYVRIRYASTTNLRLVFQNSNNDPLVIYINKTMNK 600
DB 541 LFLKESNSIAKFKVLNLSAALLQRYVRIRYASTTNLRLVFQNSNNDPLVIYINKTMNK 600
QY 601 DDLTYQTFLATNSNMFGSKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
DB 601 DDLTYQTFLATNSNMFGSKNELIIGAESFVSNKEIYIDKIEFIPVQL 652

RESULT 8
AAV23205
ID AAV23205 standard; protein; 652 AA.
XX
AC AAV23205;
AC
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11095 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera verifera LeConte; insecticide resistance.

XX Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
PS Claim 39; Page 457-460; 512pp; English.
XX
CC AAY23172-Y23206, and AAY23208-Y23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera verifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.9%; Score 3402; DB 2; Length 652;
Best Local Similarity 99.8%; Pred. No. 1.6e-276;
Matches 651; Conservative 1; Mismatches 0; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLNDS 60
DB 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLNDS 60
QY 61 TVKDVGTSVVGQILGVVGVPPFAGALTSFYQSFLNTIWPSDADPWKAPMAQVEVLIDK 120
DB 61 TVKDVGTSVVGQILGVVGVPPFAGALTSFYQSFLNTIWPSDADPWKAPMAQVEVLIDK 120
QY 121 KIEEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
DB 121 KIEEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRN 180
QY 181 SMPFSAVSKFEVLFLPTYAQAANTHLLKDAQVFGEEWGYSSYEDVAEFVHRLKLTQOY 240
DB 181 SMPFSAVSKFEVLFLPTYAQAANTHLLKDAQVFGEEWGYSSYEDVAEFVHRLKLTQOY 240
QY 241 TDHCVMNMYNGLNGLRGSTYDAWKFNRRFMTLTVDLIVLFFPYDIRLYSGVKTEL 300
DB 241 TDHCVMNMYNGLNGLRGSTYDAWKFNRRFMTLTVDLIVLFFPYDIRLYSGVKTEL 300
QY 301 TRDIFTDPFSLNTLOEYGTFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360
DB 301 TRDIFTDPFSLNTLOEYGTFLSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNW 360

CC The polypeptide can be used to kill coleopteran pests, especially by application to the environment. It is especially useful against southern corn rootworm and western corn root worm, (Diabrotica undecimpunctata howardi Barber, and Diabrotica virgifera virgifera LeConte respectively). CC The mutant cry3Bb polynucleotides can also be used to produce transgenic plants with increased insecticide resistance

XX Sequence 652 AA;

Query Match 99.9%; Score 3401; DB 2; Length 652;
Best Local Similarity 99.8%; Pred. No. 1.9e-276; Indels 0; Gaps 0;
Matches 651; Conservative 0; Mismatches 1;

QY 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSNLEELNYKEFLRMTESSTEVLNDS 60
DB 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSNLEELNYKEFLRMTESSTEVLNDS 60
QY 61 TVKDAVGTGISVVGQILGVVGVPPAGALTTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDAVGTGISVVGQILGVVGVPPAGALTTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLEFSAESHFRN 180
DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLEFSAESHFRN 180
QY 181 SMPFSAVSKFEVLFLPTVAQAANTHLLKDAQVFGGEWGYSSSDVAEFVHRQLKLTQQY 240
DB 181 SMPFSAVSKFEVLFLPTVAQAANTHLLKDAQVFGGEWGYSSSDVAEFVHRQLKLTQQY 240
QY 241 TDHCNVNWNVGLNGLRGSTDYDAWKFNFRFRREMTLTVDLVLVLPFYDILRYSKGVKTEL 300
DB 241 TDHCNVNWNVGLNGLRGSTDYDAWKFNFRFRREMTLTVDLVLVLPFYDILRYSKGVKTEL 300
QY 301 TRDIFTDPIFSLNTLOEYGPFTFLSIENSIRKPHLFDYLGQIEFTRLPQGYFGKDSFNW 360
DB 301 TRDIFTDPIFSLNTLOEYGPFTFLSIENSIRKPHLFDYLGQIEFTRLPQGYFGKDSFNW 360
QY 361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVOKLSFDGQKVTYRTANTDVAAPNGKVYLG 420
DB 361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVOKLSFDGQKVTYRTANTDVAAPNGKVYLG 420
QY 421 VTKVDFSQYDDQKNETSTQTYDYSKNNGHVSAQDSIDQLPETTDEPLEKAYSHQLNAYE 480
DB 421 VTKVDFSQYDDQKNETSTQTYDYSKNNGHVSAQDSIDQLPETTDEPLEKAYSHQLNAYE 480
QY 481 CFLMDRRGTIPFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGTGGNL 540
DB 481 CFLMDRRGTIPFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGTGGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDPLVIYINKTMWK 600
DB 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDPLVIYINKTMWK 600
QY 601 DDDLTYQTFLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
DB 601 DDDLTYQTFLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652

RESULT 10
AAV70443
ID AAV70443 standard; protein; 652 AA.
XX AC
XX AAV70443;
XX AC
XX 21-JUN-2000 (first entry)
XX Synthetic delta-endotoxin, Cry3Bb.
XX delta-endotoxin; Cry3B; Cry3Bb; Bt toxin; crystal protein; insect pest;
XX insecticide; Coleopteran; expression cassette; transgenic plant.
XX Synthetic.
OS Bacillus thuringiensis.

QY 361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVOKLSFDGQKVTYRTANTDVAAPNGKVYLG 420
DB 361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVOKLSFDGQKVTYRTANTDVAAPNGKVYLG 420
QY 421 VTKVDFSQYDDQKNETSTQTYDYSKNNGHVSAQDSIDQLPETTDEPLEKAYSHQLNAYE 480
DB 421 VTKVDFSQYDDQKNETSTQTYDYSKNNGHVSAQDSIDQLPETTDEPLEKAYSHQLNAYE 480
QY 481 CFLMDRRGTIPFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGTGGNL 540
DB 481 CFLMDRRGTIPFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGTGGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDPLVIYINKTMWK 600
DB 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDPLVIYINKTMWK 600
QY 601 DDDLTYQTFLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
DB 601 DDDLTYQTFLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652

RESULT 9
AAV23178
ID AAV23178 standard; protein; 652 AA.
XX AC
XX AAV23178;
XX AC
XX 24-AUG-1999 (first entry)
XX DE
XX Amino acid sequence of Cry3Bb.11227 polypeptide.
XX KW
XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
XX KW coleoptera; southern corn rootworm; western corn root worm;
XX KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
XX KW Diabrotica virgifera virgifera LeConte; insecticide resistance.

XX OS
XX Synthetic.
XX OS Bacillus thuringiensis.
XX PN WO9931248-A1.
XX XX
XX PD 24-JUN-1999.
XX PF 17-DEC-1998; 98WO-0206852.
XX XX
XX PR 18-DEC-1997; 97US-00993170.
XX PR 18-DEC-1997; 97US-00993722.
XX PR 18-DEC-1997; 97US-00993775.
XX PR 18-DEC-1997; 97US-00996441.
XX XX
XX (ECOG-) ECOGEN INC.
XX (MONS) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
XX PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.

XX Insecticidal Bacillus thuringiensis proteins.
XX FS
XX Claim 39; Page 306-308; 512pp; English.
XX CC
XX AAV23172-Y23206, and AAV23208-X23209 represent new Bacillus thuringiensis
XX CC Cry3Bb mutant proteins. The specification also describes methods of
XX CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
XX CC polypeptide was modified to have improved insecticidal activity or
XX CC enhanced insecticidal specificity against a target insect. The
XX CC modification comprises at least one amino acid substitution, addition, or
XX CC deletion in the primary sequence of the native or unmodified Cry3Bb
XX CC polypeptide, wherein the substitution or deletion occurs at a position
XX CC corresponding to from amino acids 1-365 of the unmodified
XX CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).


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AAV23195
ID AAV23195 standard; protein; 652 AA.
XX
AC AAV23195;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11036 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN W09931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
XX (MONS ) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
XX Walters FS, Slatin SL, von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 401-403; 512pp; English.
XX
CC AAV23172-Y23206, and AAV23208-X33209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.8%; Score 3400; DB 2; Length 652;
Best Local Similarity 99.7%; Pred. No. 2.4e-276;
Matches 650; Conservative 1; Mismatches 1; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTNPSELQTHNQYPLADNPNSTLEELNKEFLMTWDSSTVEVLNDS 60
DB 1 MNPNNRSEHDTIKVTNPSELQTHNQYPLADNPNSTLEELNKEFLMTWDSSTVEVLNDS 60
QY 61 TVKDVGTSISVVGQILGVGVPPAGALTSFYQSFNTIWPSPADPKAFMAQVEVLIDK 120
DB 61 TVKDVGTSISVVGQILGVGVPPAGALTSFYQSFNTIWPSPADPKAFMAQVEVLIDK 120
QY 121 KIEEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDRIREFLSQAESHFRN 180
DB 121 KIEEYAKSALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDRIREFLSQAESHFRN 180

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XX	PS	Claim 39; Page 356-358; 512pp; English.
XX	XX	AAV23172-Y23206, and AAV23208-X23209 represent new <i>Bacillus thuringiensis</i> Cry3Bb mutant proteins. The specification also describes methods of altering <i>Bacillus thuringiensis</i> Cry3Bb. The <i>B. thuringiensis</i> Cry3Bb polypeptide was modified to have improved insecticidal activity or enhanced insecticidal specificity against a target insect. The modification comprises at least one amino acid substitution, addition, or deletion in the primary sequence of the native or unmodified Cry3Bb polypeptide, wherein the substitution or deletion occurs at a position corresponding to from about amino acids 1-365 of the unmodified polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein). The polypeptide can be used to kill coleopteran pests, especially by application to the environment. It is especially useful against southern corn rootworm and western corn root worm, (<i>Diabrotica undecimpunctata</i> howardi Barber, and <i>Diabrotica virgifera virgifera</i> LeConte respectively). The mutant cry3Bb polynucleotides can also be used to produce transgenic plants with increased insecticide resistance
XX	SQ	Sequence 652 AA;
Query Match		
Best Local Similarity 99.8%; Score 3400; DB 2; Length 652;		
Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;		
QY	1	MNPNNRSEHDTTKVTPNSELQTNHNOYPLADNPSTLEELNYKEFLRMTESSSTEVLDS 60
DB	1	MNPNNRSEHDTTKVTPNSELQTNHNOYPLADNPSTLEELNYKEFLRMTESSSTEVLDS 60
QY	61	TVKDAVGTVGTVGVGQILGVGVFPFAGALTSFYQSFNTIWPSDADPWKAFMAQVEVLIDK 120
DB	61	TVKDAVGTVGTVGVGQILGVGVFPFAGALTSFYQSFNTIWPSDADPWKAFMAQVEVLIDK 120
QY	121	KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFN 180
DB	121	KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFN 180
QY	181	SMPSFAVSFEVLFTPTAAQANTHLLLDKQAVGEEGYSESDVAEYHRLKLTQOY 240
DB	181	SMPSFAVSFEVLFTPTAAQANTHLLLDKQAVGEEGYSESDVAEYHRLKLTQOY 240
QY	241	TDHCNVNNGVGLRGSTYDAWVFNRRERMTLTLDLIVLFFDYDIRLSKGVKTEL 300
DB	241	TDHCNVNNGVGLRGSTYDAWVFNRRERMTLTLDLIVLFFDYDIRLSKGVKTEL 300
QY	301	TRDIFTDPIFSLNTLQEGTFLSIENSIRKPHLFDYLGQIEFHTRLQPGYFGKDSFNW 360
DB	301	TRDIFTDPIFSLNTLQEGTFLSIENSIRKPHLFDYLGQIEFHTRLQPGYFGKDSFNW 360
QY	361	SGNYVETRPSIGSSKTIITSPFGDKSTEPVKLSFDGQKVYRTIANTDVAAMPNGKVYL 420
DB	361	SGNYVETRPSIGSSKTIITSPFGDKSTEPVKLSFDGQKVYRTIANTDVAAMPNGKVYL 420
QY	421	VTKVDPSQDDOKNETSTQYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHOLNVAE 480
DB	421	VTKVDPSQDDOKNETSTQYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHOLNVAE 480
QY	481	CFLMDQRRGTIPFTTWTHTRSVDFNFTIDAEKITQLPVVKAYALSSGASIIIEGFGTGGNL 540
DB	481	CFLMDQRRGTIPFTTWTHTRSVDFNFTIDAEKITQLPVVKAYALSSGASIIIEGFGTGGNL 540
QY	541	LFLKSSNSIAKFKVTLSAALLQRYVRIRVASTTNLRLFVQNSNNDPLVYIYINKTMK 600
DB	541	LFLKSSNSIAKFKVTLSAALLQRYVRIRVASTTNLRLFVQNSNNDPLVYIYINKTMK 600
QY	601	DDDLTYQTDLATTNSMFGSGDKNELIIGASSFVSNKEIYIDKTEFIIPVOL 652
DB	601	DDDLTYQTDLATTNSMFGSGDKNELIIGASSFVSNKEIYIDKTEFIIPVOL 652

ID	AAV23193	standard; protein; 652 AA.
XX	XX	
AC	AAV23193;	
XX	XX	
DT	24-AUG-1999	(first entry)
XX	XX	
DE	Amino acid sequence of Cry3Bb.11032 polypeptide.	
XX	XX	
KW	Cry3Bb; mutant; insecticidal activity; insecticidal specificity;	
KW	coleoptera; southern corn rootworm; western corn root worm;	
KW	<i>Diabrotica undecimpunctata</i> howardi Barber; transgenic plant;	
KW	<i>Diabrotica virgifera virgifera</i> LeConte; insecticide resistance.	
XX	XX	
OS	Synthetic.	
OS	<i>Bacillus thuringiensis</i> .	
XX	XX	
FN	WO9931248-A1.	
XX	XX	
PD	24-JUN-1999.	
XX	XX	
PF	17-DEC-1998; 98WO-US026852.	
XX	XX	
PR	18-DEC-1997; 97US-00993170.	
PR	18-DEC-1997; 97US-00993722.	
PR	18-DEC-1997; 97US-00993775.	
PR	18-DEC-1997; 97US-009956441.	
XX	XX	
PA	(ECOG-) ECOGEN INC.	
PA	(MONS) MONSANTO CO.	
XX	XX	
PI	English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;	
PI	Walters PS, Slatin SL, Von Tersch MA, Romano C;	
XX	XX	
DR	WPI; 1999-395184/33.	
XX	XX	
PT	Insecticidal <i>Bacillus thuringiensis</i> proteins.	
XX	XX	
PS	Claim 39; Page 390-392; 512pp; English.	
XX	XX	
CC	AAV23172-Y23206, and AAV23208-X23209 represent new <i>Bacillus thuringiensis</i> Cry3Bb mutant proteins. The specification also describes methods of altering <i>Bacillus thuringiensis</i> Cry3Bb. The <i>B. thuringiensis</i> Cry3Bb polypeptide was modified to have improved insecticidal activity or enhanced insecticidal specificity against a target insect. The modification comprises at least one amino acid substitution, addition, or deletion in the primary sequence of the native or unmodified Cry3Bb polypeptide, wherein the substitution or deletion occurs at a position corresponding to from about amino acids 1-365 of the unmodified polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein). The polypeptide can be used to kill coleopteran pests, especially by application to the environment. It is especially useful against southern corn rootworm and western corn root worm, (<i>Diabrotica undecimpunctata</i> howardi Barber, and <i>Diabrotica virgifera virgifera</i> LeConte respectively). The mutant cry3Bb polynucleotides can also be used to produce transgenic plants with increased insecticide resistance	
XX	XX	
SQ	Sequence 652 AA;	
Query Match		
Best Local Similarity 99.8%; Score 3399; DB 2; Length 652;		
Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;		
QY	1	MNPNNRSEHDTTKVTPNSELQTNHNOYPLADNPSTLEELNYKEFLRMTESSSTEVLDS 60
DB	1	MNPNNRSEHDTTKVTPNSELQTNHNOYPLADNPSTLEELNYKEFLRMTESSSTEVLDS 60
QY	61	TVKDAVGTVGTVGVGQILGVGVFPFAGALTSFYQSFNTIWPSDADPWKAFMAQVEVLIDK 120
DB	61	TVKDAVGTVGTVGVGQILGVGVFPFAGALTSFYQSFNTIWPSDADPWKAFMAQVEVLIDK 120
QY	121	KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFN 180
DB	121	KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFN 180

181 SMPFAVSKFEVLFLPTTAAQANTHLLLLKDAQVFGGEWGYSSDVAEFYHROLKLTQQY 240
181 SMPFAVSKFEVLFLPTTAAQANTHLLLLKDAQVFGGEWGYSSDVAEFYHROLKLTQQY 240
241 TDHCVNMYNGLNGRSTYDAMWKFNRFRREMTLTVDLIVLPFFYDIRLYSGVKTEL 300
241 TDHCVNMYNGLNGRSTYDAMWKFNRFRREMTLTVDLIVLPFFYDIRLYSGVKTEL 300
301 TRDIFTDPIFSLNTLQYGTFLSIENSIKPKHFLDYLOGIEFHTRLQPGYFGKDSFNW 360
301 TRDIFTDPIFSLNTLQYGTFLSIENSIKPKHFLDYLOGIEFHTRLQPGYFGKDSFNW 360
361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKQVYRTIANTDVAWPNKGKYL 420
361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKQVYRTIANTDVAWPNKGKYL 420
421 VTKVDFSQYDDQKNETSTQYDSKRNNGHVSAQDSIDLPPETTDEPLEKAYSHQLN 480
421 VTKVDFSQYDDQKNETSTQYDSKRNNGHVSAQDSIDLPPETTDEPLEKAYSHQLN 480
481 CFLMODRRGTIPFTTTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTG 540
481 CFLMODRRGTIPFTTTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTG 540
541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVYINKTM 600
541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVYINKTM 600
601 DDLTYQTFDLATNSNMGFSGDKNELIIIGAESFVSNKEIYIDKIEFIPVOL 652
601 DDLTYQTFDLATNSNMGFSGDKNELIIIGAESFVSNKEIYIDKIEFIPVOL 652

RESULT 16

AA23175
ID AA23175 standard; protein; 652 AA.

XX
AC AA23175;

XX
DT 24-AUG-1999 (first entry)

XX
DE Amino acid sequence of Cry3Bb.11051 polypeptide.

XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera verifera LeConte; insecticide resistance.

XX
OS Synthetic.

OS Bacillus thuringiensis.

XX
PN WO9931248-A1.

XX
PD 24-JUN-1999.

XX
PF 17-DEC-1998; 98WO-US026852.

XX
PR 18-DEC-1997; 97US-00993170.

PR 18-DEC-1997; 97US-00993722.

PR 18-DEC-1997; 97US-00993775.

XX
PR 18-DEC-1997; 97US-00996441.

XX
PA (ECOG-) ECOGEN INC.

PA (MONS) MONSANTO CO.

XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;

XX
PI Walters FS, Slaton SL, Von Tersch MA, Romano C;

XX
DR WPI; 1999-395184/33.

XX
PT Insecticidal Bacillus thuringiensis proteins.

XX

PS Claim 39; Page 418-420; 512pp; English.

XX
CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera verifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.8%; Score 3399; DB 2; Length 652;

Best Local Similarity 99.8%; Pred. No. 2.9e-276;

Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVL 60

DB 1 MNPNNRSEHDTIKVTNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVL 60

QY 61 TVKDAVGTGIVVGVQILGVVGVFPAGALTSTFYQSLNTWPSSDADPWKAFMAQVEVL 120

DB 61 TVKDAVGTGIVVGVQILGVVGVFPAGALTSTFYQSLNTWPSSDADPWKAFMAQVEVL 120

QY 121 KIEEYAKSKALAELOGIQQNFEDYVNALNSWKKTPLSLRSKRSQDRIRRELFSQASH 180

DB 121 KIEEYAKSKALAELOGIQQNFEDYVNALNSWKKTPLSLRSKRSQDRIRRELFSQASH 180

QY 181 SMPFAVSKFEVLFLPTTAAQANTHLLLLKDAQVFGGEWGYSSDVAEFYHROLKLTQQY 240

DB 181 SMPFAVSKFEVLFLPTTAAQANTHLLLLKDAQVFGGEWGYSSDVAEFYHROLKLTQQY 240

QY 241 TDHCVNMYNGLNGRSTYDAMWKFNRFRREMTLTVDLIVLPFFYDIRLYSGVKTEL 300

DB 241 TDHCVNMYNGLNGRSTYDAMWKFNRFRREMTLTVDLIVLPFFYDIRLYSGVKTEL 300

QY 301 TRDIFTDPIFSLNTLQYGTFLSIENSIKPKHFLDYLOGIEFHTRLQPGYFGKDSFNW 360

DB 301 TRDIFTDPIFSLNTLQYGTFLSIENSIKPKHFLDYLOGIEFHTRLQPGYFGKDSFNW 360

QY 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKQVYRTIANTDVAWPNKGKYL 420

DB 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKQVYRTIANTDVAWPNKGKYL 420

QY 421 VTKVDFSQYDDQKNETSTQYDSKRNNGHVSAQDSIDLPPETTDEPLEKAYSHQLN 480

DB 421 VTKVDFSQYDDQKNETSTQYDSKRNNGHVSAQDSIDLPPETTDEPLEKAYSHQLN 480

QY 481 CFLMODRRGTIPFTTTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTG 540

DB 481 CFLMODRRGTIPFTTTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTG 540

QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVYINKTM 600

DB 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDFLVYINKTM 600

QY 601 DDLTYQTFDLATNSNMGFSGDKNELIIIGAESFVSNKEIYIDKIEFIPVOL 652

DB 601 DDLTYQTFDLATNSNMGFSGDKNELIIIGAESFVSNKEIYIDKIEFIPVOL 652

RESULT 17

AA23175

ID AA23175 standard; protein; 652 AA.

XX AAY231175;
AC 24-AUG-1999 (first entry)
DT Amino acid sequence of Cry3Bb.11224 polypeptide.
DE
DE Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera virgifera LeConte; insecticide resistance.
XX Synthetic.
OS Bacillus thuringiensis.
OS
XX WO9931248-A1.
XX 24-JUN-1999.
XX 17-DEC-1998; 98WO-US026852.
XX 18-DEC-1997; 97US-00993170.
XX 18-DEC-1997; 97US-00993722.
XX 18-DEC-1997; 97US-00993775.
XX 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
DR
XX Insecticidal Bacillus thuringiensis proteins.
PT
XX Claim 39; Page 289-291; 512pp; English.
PS
XX AAY231172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
XX Sequence 652 AA;
S

Query Match 99.8%; Score 3398; DB 2; Length 652;
Best Local Similarity 99.8%; Pred. No. 3.5e-276;
Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTTKVTNSLQTNHNYOPLADNPNSLTLELNKKEFLRMTEDSSTEVLNDS 60
DB 1 MNPNNRSEHDTTKVTNSLQTNHNYOPLADNPNSLTLELNKKEFLRMTEDSSTEVLNDS 60
QY 61 TVKDAVGTGIVGVVQILGVVVPFAGALTSFYQSLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDAVGTGIVGVVQILGVVVPFAGALTSFYQSLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOQLQNNFEDYNALNSWKKTPLSLRSKRSQDRIRFLFQAESHPFN 180
DB 121 KIEEYAKSKALAELOQLQNNFEDYNALNSWKKTPLSLRSKRSQDRIRFLFQAESHPFN 180

QY 181 SMPSFVSKFEVLFLPTTYAQAANTHLLLLKDAQVFGBEWGYSSDVAEFYHRQLKLTOQY 240
DB 181 SMPSFVSKFEVLFLPTTYAQAANTHLLLLKDAQVFGBEWGYSSDVAEFYHRQLKLTOQY 240
QY 241 TDHCNWNYNVGLNGLRGSTDYDAWKFNFRPREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
DB 241 TDHCNWNYNVGLNGLRGSTDYDAWKFNFRPREMTLTVLDLIVLFPFYDIRLYSKGVKTEL 300
QY 301 TRDIFTDPIFSLNTLOEYGPFTFLSIENSIRKPHLFDYLOGLIEFHTRLQPGYFGKDSFNW 360
DB 301 TRDIFTDPIFSLNTLOEYGPFTFLSIENSIRKPHLFDYLOGLIEFHTRLQPGYFGKDSFNW 360
QY 361 SGNVETRPSIGSSKTTITSPFYGDKSTEPVQKLSFDGQKVYRTTANTDVAAPNPKVYLG 420
DB 361 SGNVETRPSIGSSKTTITSPFYGDKSTEPVQKLSFDGQKVYRTTANTDVAAPNPKVYLG 420
QY 421 VTKVDFSOYDDOKNETSTQTYDSKRNNGHVSAQSIDQLPPTTDEPLEKAYSHQLNVAE 480
DB 421 VTKVDFSOYDDOKNETSTQTYDSKRNNGHVSAQSIDQLPPTTDEPLEKAYSHQLNVAE 480
QY 481 CFLMQDRGTIPFFFTWTHRSVDFNTDAEKITOLPVVKAYALSSGASIIIEGPGFTGGNL 540
DB 481 CFLMQDRGTIPFFFTWTHRSVDFNTDAEKITOLPVVKAYALSSGASIIIEGPGFTGGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRIRYASTTNLRLFVQNSNNDFLVIYINKTNWK 600
DB 541 LFLKSSNSIAKFKVTLNSAALLQRYRIRYASTTNLRLFVQNSNNDFLVIYINKTNWK 600
QY 601 DDDLTYYQTFDLATNNSNMGFSGDKNELIIGAESFVSNKEKIYIDKIEFIPVQL 652
DB 601 DDDLTYYQTFDLATNNSNMGFSGDKNELIIGAESFVSNKEKIYIDKIEFIPVQL 652
RESULT 18
AAY231184
ID AAY231184 standard; protein; 652 AA.
XX
AC AAY231184;
XX 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11233 polypeptide.
DE
XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera virgifera LeConte; insecticide resistance.
XX Synthetic.
OS Bacillus thuringiensis.
OS
XX WO9931248-A1.
XX 24-JUN-1999.
XX 17-DEC-1998; 98WO-US026852.
XX 18-DEC-1997; 97US-00993170.
XX 18-DEC-1997; 97US-00993722.
XX 18-DEC-1997; 97US-00993775.
XX 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX Insecticidal Bacillus thuringiensis proteins.
PT
XX Claim 39; Page 339-342; 512pp; English.
PS

```

XX AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;
Query Match 99.8%; Score 3398; DB 2; Length 652;
Best Local Similarity 99.7%; Pred. No. 3.5e-276;
Matches 650; Conservative 1; Mismatches 1; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPSTLEELNYKEFLRMTESSSTEVLNDS 60
DB 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPSTLEELNYKEFLRMTESSSTEVLNDS 60
QY 61 TVKDVGTSISVVGQILGVGVFPFAGALTSFYQSFLNTIWPSPDADPWKAFMAQVEVLIDK 120
DB 61 TVKDVGTSISVVGQILGVGVFPFAGALTSFYQSFLNTIWPSPDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLEFSAQESHFRN 180
DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLEFSAQESHFRN 180
QY 181 SMPFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEGYSSSEDAEFYHRLKLTQQY 240
DB 181 SMPFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEGYSSSEDAEFYHRLKLTQQY 240
QY 241 TDHCVNWNVGNLGRSTYDAWKNNRFRREMTLVLDLIVLPFYDIRLYSGVKYTEL 300
DB 241 TDHCVNWNVGNLGRSTYDAWKNNRFRREMTLVLDLIVLPFYDIRLYSGVKYTEL 300
QY 301 TRDIFTDPIFSLNTOEYGTPELSIENSIRKPHLFDYLOQIEPHTRLQPGYFGKDSFNW 360
DB 301 TRDIFTDPIFSLNTOEYGTPELSIENSIRKPHLFDYLOQIEPHTRLQPGYFGKDSFNW 360
QY 361 SGNVYETRPSIGSKTITSPFYGDKSTPEVQKLSFDGQKYRTIANTDVAAMPNGKVIYLG 420
DB 361 SGNVYETRPSIGSKTITSPFYGDKSTPEVQKLSFDGQKYRTIANTDVAAMPNGKVIYLG 420
QY 421 VTKVDFSOYDDQKNETSTQYDSKRNGHVSADSIDLPPETTDPLEKAYSHQLNYAE 480
DB 421 VTKVDFSOYDDQKNETSTQYDSKRNGHVSADSIDLPPETTDPLEKAYSHQLNYAE 480
QY 481 CFLMQDRRGTPFPFTTHRSVDFNFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGGNL 540
DB 481 CFLMQDRRGTPFPFTTHRSVDFNFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGGNL 540
QY 541 LFLKSSNSIAKPKVLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
DB 541 LFLKSSNSIAKPKVLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
QY 601 DDLTYTQTFDLATNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
DB 601 DDLTYTQTFDLATNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652

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RESULT 19

AAY23192

ID AAY23192 standard; protein; 652 AA.

XX

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AC AAY23192;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11242 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS ) MONSANTO CO.
XX
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slaton SL, von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
PT
XX
PS Claim 39; Page 384-387; 512pp; English.
XX
XX AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;
Query Match 99.8%; Score 3398; DB 2; Length 652;
Best Local Similarity 99.8%; Pred. No. 3.5e-276;
Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPSTLEELNYKEFLRMTESSSTEVLNDS 60
DB 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPSTLEELNYKEFLRMTESSSTEVLNDS 60
QY 61 TVKDVGTSISVVGQILGVGVFPFAGALTSFYQSFLNTIWPSPDADPWKAFMAQVEVLIDK 120
DB 61 TVKDVGTSISVVGQILGVGVFPFAGALTSFYQSFLNTIWPSPDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLEFSAQESHFRN 180
DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLEFSAQESHFRN 180
QY 181 SMPFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEGYSSSEDAEFYHRLKLTQQY 240

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161 SMPFAVSKFEVLFLPTTAAQANTHLLKDAQVGEEMGYSSDVAEFYHQKLQY 240
241 TDHCNVNNGVGLRGSTYDAWVFNFRREMTLVLDLVLPPFYDIRLYSGVKTEL 300
241 TDHCNVNNGVGLRGSTYDAWVFNFRREMTLVLDLVLPPFYDIVLYSGVKTEL 300
301 TRDIFTDPIFSLNTLOEYGPTELSTENSRKPHLFDYLGQIEFHTRLQPGYFGKDSFNYW 360
301 TRDIFTDPIFSLNTLOEYGPTELSTENSRKPHLFDYLGQIEFHTRLQPGYFGKDSFNYW 360
361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVKLSFDGQKVYRTIANTDVAAPNGKVYL 420
361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVKLSFDGQKVYRTIANTDVAAPNGKVYL 420
421 VTKVDFSOYDDQKNETSTQTYDSKNNGHVSAQDSIDQLPPTTDEPLEKAYSHQLYAE 480
421 VTKVDFSOYDDQKNETSTQTYDSKNNGHVSAQDSIDQLPPTTDEPLEKAYSHQLYAE 480
481 CFMMDRRGTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNL 540
481 CFMMDRRGTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNL 540
541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTNK 600
541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTNK 600
601 DDLLTYQTPTDATTNSNMFGSGDKNELIIGAESFVSNKIIYIDKIEFIPVQL 652
601 DDLLTYQTPTDATTNSNMFGSGDKNELIIGAESFVSNKIIYIDKIEFIPVQL 652

RESULT 20
AAV23203
ID AAV23203 standard; protein; 652 AA.
AC AAV23203;
XX
XX 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11083 polypeptide.
XX
XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
XX coleoptera; southern corn rootworm; western corn root worm;
XX Diabrotica undecimpunctata howardi Barber; transgenic plant;
XX Diabrotica virgifera vergifera LeConte; insecticide resistance.

OS Synthetic.
OS Bacillus thuringiensis.
XX W09931248-A1.
XX
XX 24-JUN-1999.
XX
XX 17-DEC-1998; 98WO-US026852.
XX
XX 18-DEC-1997; 97US-00993170.
XX 18-DEC-1997; 97US-00993722.
XX 18-DEC-1997; 97US-00993775.
XX 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
XX (MONS) MONSANTO CO.
XX English L, Brusocco SM, Malvar TM, Bryson JW, Kulesza CA;
XX PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
XX
XX Claim 39; Page 446-448; 512pp; English.

CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from amino acids 1-365 of the unmodified
CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;
Query Match 99.7%; Score 3396; DB 2; Length 652;
Best Local Similarity 99.5%; Pred. No. 5.1e-276;
Matches 649; Conservative 2; Mismatches 1; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELOQTNHNPPLADNPSTLEELNYKEFLMTEDSDTEVLNLS 60
DB 1 MNPNNRSEHDTIKVTPNSELOQTNHNPPLADNPSTLEELNYKEFLMTEDSDTEVLNLS 60
QY 61 TVKDAVGTGISVVGQILGVGVVPAGALTTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDAVGTGISVVGQILGVGVVPAGALTTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOQLQNNFEDYVNALNSWKTPSLRSKRSDRIREFLSQAESFRN 180
DB 121 KIEEYAKSKALAELOQLQNNFEDYVNALNSWKTPSLRSKRSDRIREFLSQAESFRN 180
QY 181 SMPFAVSKFEVLFLPTTAAQANTHLLKDAQVGEEMGYSSDVAEFYHQKLQY 240
DB 181 SMPFAVSKFEVLFLPTTAAQANTHLLKDAQVGEEMGYSSDVAEFYHQKLQY 240
QY 241 TDHCNVNNGVGLRGSTYDAWVFNFRREMTLVLDLVLPPFYDIRLYSGVKTEL 300
DB 241 TDHCNVNNGVGLRGSTYDAWVFNFRREMTLVLDLVLPPFYDIRLYSGVKTEL 300
QY 301 TRDIFTDPIFSLNTLOEYGPTELSTENSRKPHLFDYLGQIEFHTRLQPGYFGKDSFNYW 360
DB 301 TRDIFTDPIFSLNTLOEYGPTELSTENSRKPHLFDYLGQIEFHTRLQPGYFGKDSFNYW 360
QY 361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVKLSFDGQKVYRTIANTDVAAPNGKVYL 420
DB 361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVKLSFDGQKVYRTIANTDVAAPNGKVYL 420
QY 421 VTKVDFSOYDDQKNETSTQTYDSKNNGHVSAQDSIDQLPPTTDEPLEKAYSHQLYAE 480
DB 421 VTKVDFSOYDDQKNETSTQTYDSKNNGHVSAQDSIDQLPPTTDEPLEKAYSHQLYAE 480
QY 481 CFMMDRRGTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNL 540
DB 481 CFMMDRRGTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNL 540
QY 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTNK 600
DB 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTNK 600
QY 601 DDLLTYQTPTDATTNSNMFGSGDKNELIIGAESFVSNKIIYIDKIEFIPVQL 652
DB 601 DDLLTYQTPTDATTNSNMFGSGDKNELIIGAESFVSNKIIYIDKIEFIPVQL 652

RESULT 21
AAV23177
ID AAY23177 standard; protein; 652 AA.
XX
XX AAY23177;
AC

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XX 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11226 polypeptide.
XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
XX coleoptera; southern corn rootworm; western corn root worm;
XX Diabrotica undecimpunctata howardi Barber; transgenic plant;
XX Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX OS Synthetic.
XX OS Bacillus thuringiensis.
XX PN WO9931248-A1.
XX 24-JUN-1999.
XX 17-DEC-1998; 98WO-US026852.
XX 18-DEC-1997; 97US-00993170.
XX 18-DEC-1997; 97US-00993722.
XX 18-DEC-1997; 97US-00993775.
XX 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
XX (MONS ) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
XX Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX Insecticidal Bacillus thuringiensis proteins.
XX Claim 39; Page 300-302; 512pp; English.
XX AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
XX Cry3Bb mutant proteins. The specification also describes methods of
XX altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
XX polypeptide was modified to have improved insecticidal activity or
XX enhanced insecticidal specificity against a target insect. The
XX modification comprises at least one amino acid substitution, addition, or
XX deletion in the primary sequence of the native or unmodified Cry3Bb
XX polypeptide, wherein the substitution or deletion occurs at a position
XX corresponding to from about amino acids 1-365 of the unmodified
XX polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
XX The polypeptide can be used to kill coleopteran pests, especially by
XX application to the environment. It is especially useful against southern
XX corn rootworm and western corn root worm, (Diabrotica undecimpunctata
XX howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
XX The mutant cry3Bb polynucleotides can also be used to produce transgenic
XX plants with increased insecticide resistance
XX SQ Sequence 652 AA;

Query Match 99.7%; Score 3396; DB 2; Length 652;
Best Local Similarity 99.8%; Pred. No. 5 1e-276;
Matches 651; Conservative 0; Mismatches 1; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTNPSELQTNHNYPLADNPNSTLEELNKEFLRMTEDSSTEVLDNS 60
DB 1 MNPNNRSEHDTIKVTNPSELQTNHNYPLADNPNSTLEELNKEFLRMTEDSSTEVLDNS 60
QY 61 TVKDVGTGIVGVGQILGVGVFPAGALTSPFYQFLNTIWPSPADPKAFMAQVEVLIDK 120
DB 61 TVKDVGTGIVGVGQILGVGVFPAGALTSPFYQFLNTIWPSPADPKAFMAQVEVLIDK 120
QY 121 KIEEYAKSALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLFSAQESHFRN 180
DB 121 KIEEYAKSALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLFSAQESHFRN 180
QY 181 SMPSPAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEGYSSEDAEFYHROLKLTQY 240
DB 181 SMPSPAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEGYSSEDAEFYHROLKLTQY 240

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DB 181 SMPSPAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEGYSSEDAEFYHROLKLTQY 240
QY 241 TDHCVNWNVNGNLGRSTYDAWVKENRFRREMTLVLDLIVLPFPFDYDIRLYSGVKTEL 300
DB 241 TDHCVNWNVNGNLGRSTYDAWVKENRFRREMTLVLDLIVLPFPFDYDIRLYSGVKTEL 300
QY 301 TRDIFTDPIFSLNTLQEGYPTFLSIENSIRKPHLFDYLDQIEFHTRLQPGYFGKDSFNYW 360
DB 301 TRDIFTDPIFSLNTLQEGYPTFLSIENSIRKPHLFDYLDQIEFHTRLQPGYFGKDSFNYW 360
QY 361 SGNVETRPSIGSSKTIPTSPFYGDKSTEPVKQLSPDGQKVYRTIANTDVAANPCKVYLG 420
DB 361 SGNVETRPSIGSSKTIPTSPFYGDKSTEPVKQLSPDGQKVYRTIANTDVAANPCKVYLG 420
QY 421 VTKVDFSOYDDQKNETSTQYDSKRNGHVSAODSIDQLPETTDEPLEKAYSHQLNAYE 480
DB 421 VTKVDFSOYDDQKNETSTQYDSKRNGHVSAODSIDQLPETTDEPLEKAYSHQLNAYE 480
QY 481 CFLMQDRRGITPFPFTWTHRSVDFNTIDAEKITQLPVPVKAYALSSGASIIEGFGFTGNNL 540
DB 481 CFLMQDRRGITPFPFTWTHRSVDFNTIDAEKITQLPVPVKAYALSSGASIIEGFGFTGNNL 540
QY 541 LFLKSSNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
DB 541 LFLKSSNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
QY 601 DDDLTYQTFLDATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
DB 601 DDDLTYQTFLDATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652

RESULT 22
AAY23176
ID AAY23176 standard; protein; 652 AA.
XX
AC AAY23176;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11225 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS ) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
PT Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 294-297; 512pp; English.
XX
CC AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis

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CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AA23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.7%; Score 3395; DB 2; Length 652;
Best Local Similarity 99.7%; Pred. No. 6.2e-276;
Matches 650; Conservative 2; Mismatches 0; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTPNSELQTNHQQYPLADNPSTLEELNYKEFLRMTEDSSTEVLNDS 60
DB 1 MNPNNRSEHDTIKVTPNSELQTNHQQYPLADNPSTLEELNYKEFLRMTEDSSTEVLNDS 60
QY 61 TVKDVGAGTGISVVGQILGVGVPPFAGALTSFYQSEFLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDVGAGTGISVVGQILGVGVPPFAGALTSFYQSEFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFN 180
DB 121 KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFN 180
QY 181 SMPFAVSKFEVLFLPTTAAQANTHLLLLKDAQVGEWGYSSSDVAEFYHRLKLTQOY 240
DB 181 SMPFAVSKFEVLFLPTTAAQANTHLLLLKDAQVGEWGYSSSDVAEFYHRLKLTQOY 240
QY 241 THCVNWNVGLNGLRGSTDYDAWKFNRRREMTLTVLDLIVLFPFYDIRLSKGVKTEL 300
DB 241 SDHCNVNWNVGLNGLRGSTDYDAWKFNRRREMTLTVLDLIVLFPFYDIRLSKGVKTEL 300
QY 301 TRDIFTDFISLNTIQEYGPTELSTENSRKPHLFDYLGQIEFHTRLQPGYFGKDSFNW 360
DB 301 TRDIFTDFISLNTIQEYGPTEFLSTENSRKPHLFDYLGQIEFHTRLQPGYFGKDSFNW 360
QY 361 SGNVYETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 420
DB 361 SGNVYETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 420
QY 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHQINLVAE 480
DB 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHQINLVAE 480
QY 481 CFLMDORRGITPFTWTHRSVDFNTIDAEKITQLPVKAYALSSGASIIIEGFGFTGNL 540
DB 481 CFLMDORRGITPFTWTHRSVDFNTIDAEKITQLPVKAYALSSGASIIIEGFGFTGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDPLVIYINKTMNK 600
DB 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNNDPLVIYINKTMNK 600
QY 601 DDLTYQTQFDLATTNSMFGSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652
DB 601 DDLTYQTQFDLATTNSMFGSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652

RESULT 23
AA23188
ID AA23188 standard; protein; 652 AA.
XX
AC AA23188;
XX

DT 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11237 polypeptide.
DE
XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von ferssch MA, Romano C;
XX
DR WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
PT
XX
PS Claim 39; Page 362-364; 512pp; English.
XX
XX AA23172-Y23206, and AA23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AA23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.7%; Score 3395; DB 2; Length 652;
Best Local Similarity 99.7%; Pred. No. 6.2e-276;
Matches 650; Conservative 1; Mismatches 1; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTPNSELQTNHQQYPLADNPSTLEELNYKEFLRMTEDSSTEVLNDS 60
DB 1 MNPNNRSEHDTIKVTPNSELQTNHQQYPLADNPSTLEELNYKEFLRMTEDSSTEVLNDS 60
QY 61 TVKDVGAGTGISVVGQILGVGVPPFAGALTSFYQSEFLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDVGAGTGISVVGQILGVGVPPFAGALTSFYQSEFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFN 180
DB 121 KIEEYAKSKALAEQLQGNFEDYVNALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFN 180
QY 181 SMPFAVSKFEVLFLPTTAAQANTHLLLLKDAQVGEWGYSSSDVAEFYHRLKLTQOY 240
DB 181 SMPFAVSKFEVLFLPTTAAQANTHLLLLKDAQVGEWGYSSSDVAEFYHRLKLTQOY 240

QY 241 TDHCNNVYVGLNGLRGSTYDAWKFNRRFEMTLTVLDLIVLPFPFYDIRLSKGVKTEL 300
 DB 241 TDHCNNVYVGLNGLRGSTYDAWKFNRRFEMTLTVLDLIVLPFPFYDIRLSKGVKTEL 300
 QY 301 TRDIFTDPIFSLANTLOEYGTFLSIENSIRKPHLFDYLOGIEPHTRLQPGYFGKDSFNW 360
 DB 301 TRDIFTDPIFSLANTLOEYGTFLSIENSIRKPHLFDYLOGIEPHTRLQPGYFGKDSFNW 360
 QY 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDQKQVYRTIANTDVAWPNKGVYLG 420
 DB 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDQKQVYRTIANTDVAWPNKGVYLG 420
 QY 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAODSIDQLPPTTDEPLEKAYSHQLNYAE 480
 DB 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAODSIDQLPPTTDEPLEKAYSHQLNYAE 480
 QY 481 CFLMQDRRGITPFTTWTTHRSVDFNTIDAETKIQLPVVKAYALSSGASIIIEGPGFTGNNL 540
 DB 481 CFLMQDRRGITPFTTWTTHRSVDFNTIDAETKIQLPVVKAYALSSGASIIIEGPGFTGNNL 540
 QY 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDPLVIVINKTMNK 600
 DB 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDPLVIVINKTMNK 600
 QY 601 DDLTYQTDFLATTNSNMFGSGDKNELIIGAESFVSNKEIYIDKIEPIPVQL 652
 DB 601 DDLTYQTDFLATTNSNMFGSGDKNELIIGAESFVSNKEIYIDKIEPIPVQL 652

RESULT 24

AAV23181
 ID AAY23181 standard; protein; 652 AA.

XX AAY23181;

DT 24-AUG-1999 (first entry)

DE Amino acid sequence of Cry3Bb.11230 polypeptide.

XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
 KW coleoptera; southern corn rootworm; western corn root worm;
 KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
 KW Diabrotica virgifera vergifera LeConte; insecticide resistance.

XX Synthetic.

OS Bacillus thuringiensis.

XX WO9931248-A1.

PN 24-JUN-1999.

XX 17-DEC-1998; 98WO-US026852.

XX 18-DEC-1997; 97US-00993170.

PR 18-DEC-1997; 97US-00993722.

PR 18-DEC-1997; 97US-00993775.

PR 18-DEC-1997; 97US-00996441.

XX (ECOG-) ECOGEN INC.

PA (MONS) MONSANTO CO.

XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;

PI Walters FS, Slatin SL, Von Tersch MA, Romano C;

XX WPI; 1999-395184/33.

XX Insecticidal Bacillus thuringiensis proteins.

XX Claim 39; Page 322-325; 512pp; English.

XX AAY23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
 CC Cry3Bb mutant proteins. The specification also describes methods of

CC altering *Bacillus thuringiensis* Cry3Bb. The *B. thuringiensis* Cry3Bb
 CC polypeptide was modified to have improved insecticidal activity or
 CC enhanced insecticidal specificity against a target insect. The
 CC modification comprises at least one amino acid substitution, addition, or
 CC deletion in the primary sequence of the native or unmodified Cry3Bb
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from amino acids 1-365 of the unmodified
 CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
 CC The polypeptide can be used to kill coleopteran pests, especially by
 CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn root worm, (*Diabrotica undecimpunctata*
 CC howardi Barber, and *Diabrotica virgifera vergifera* LeConte respectively).
 CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance
 XX
 SQ Sequence 652 AA;

Query Match 99.6%; Score 3393; DB 2; Length 652;
 Best Local Similarity 99.9%; Pred. No. 9.1e-276;
 Matches 649; Conservative 2; Mismatches 1; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLNDS 60
 DB 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLNDS 60

QY 61 TVKDAVGTGIVVVGQILGVVGVFPFAGALTSTFYQSFLNTIWPSDADPWKAPMAQVEVLIDK 120
 DB 61 TVKDAVGTGIVVVGQILGVVGVFPFAGALTSTFYQSFLNTIWPSDADPWKAPMAQVEVLIDK 120

QY 121 KIBEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDRIRELFSQAESHFN 180
 DB 121 KIBEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDRIRELFSQAESHFN 180

QY 181 SMPSPAVSKFEVLPLPTAQAANTHLLLLKDAQVFGSENGYSSSEDAEFVHRLKLTQQY 240
 DB 181 SMPSPAVSKFEVLPLPTAQAANTHLLLLKDAQVFGSENGYSSSEDAEFVHRLKLTQQY 240

QY 241 TDHCNNVYVGLNGLRGSTYDAWKFNRRFEMTLTVLDLIVLPFPFYDIRLSKGVKTEL 300
 DB 241 TDHCNNVYVGLNGLRGSTYDAWKFNRRFEMTLTVLDLIVLPFPFYDIRLSKGVKTEL 300

QY 301 TRDIFTDPIFSLANTLOEYGTFLSIENSIRKPHLFDYLOGIEPHTRLQPGYFGKDSFNW 360
 DB 301 TRDIFTDPIFSLANTLOEYGTFLSIENSIRKPHLFDYLOGIEPHTRLQPGYFGKDSFNW 360

QY 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDQKQVYRTIANTDVAWPNKGVYLG 420
 DB 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDQKQVYRTIANTDVAWPNKGVYLG 420

QY 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAODSIDQLPPTTDEPLEKAYSHQLNYAE 480
 DB 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAODSIDQLPPTTDEPLEKAYSHQLNYAE 480

QY 481 CFLMQDRRGITPFTTWTTHRSVDFNTIDAETKIQLPVVKAYALSSGASIIIEGPGFTGNNL 540
 DB 481 CFLMQDRRGITPFTTWTTHRSVDFNTIDAETKIQLPVVKAYALSSGASIIIEGPGFTGNNL 540

QY 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDPLVIVINKTMNK 600
 DB 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDPLVIVINKTMNK 600

QY 601 DDLTYQTDFLATTNSNMFGSGDKNELIIGAESFVSNKEIYIDKIEPIPVQL 652
 DB 601 DDLTYQTDFLATTNSNMFGSGDKNELIIGAESFVSNKEIYIDKIEPIPVQL 652

RESULT 25

AAV23204

ID AAY23204 standard; protein; 652 AA.

XX AAY23204;

XX 24-AUG-1999 (first entry)

XX Amino acid sequence of Cry3Bb.11084 polypeptide.
DE
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-Al.
XX
PD 24-JUN-1999.
XX
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-009931170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
XX WPI; 1999-395184/33.
DR
XX
XX Insecticidal Bacillus thuringiensis proteins.
XX
XX
PS Claim 39; Page 452-454; 512pp; English.
XX
XX
CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from amino acids 1-365 of the unmodified
CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.6%; Score 3393; DB 2; Length 652;
Best Local Similarity 99.7%; Pred. No. 9.1e-276;
Matches 650; Conservative 0; Mismatches 2; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTTKVTPNSELQTNHNOYPLADNPSTLEELNYKEFLRMTEDSSTVELDNS 60
DB 1 MNPNNRSEHDTTKVTPNSELQTNHNOYPLADNPSTLEELNYKEFLRMTEDSSTVELDNS 60
QY 61 TVKDAVGTGISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDAVGTGISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAEQLQNNFEDYVNALNSWKTKPLSLRSKRSQDRIRFLFSQAESHFRN 180
DB 121 KIEEYAKSKALAEQLQNNFEDYVNALNSWKTKPLSLRSKRSQDRIRFLFSQAESHFRN 180
QY 181 SMPFAVSKFEVLFTPTAAQANTHLLLLKDAQVFGEEWGYSSDVAEYFHRQLKLTQOY 240
DB 181 SMPFAVSKFEVLFTPTAAQANTHLLLLKDAQVFGEEWGYSSDVAEYFHRQLKLTQOY 240

QY 241 TDHCVNWNVGLGLRGSTYDAWVKFNFRREMTLTVLDLVLVLPFFDYDIRLYSKGVKTEL 300
DB 241 TDHCVNWNVGLGLRGSTYDAWVKFNFRREMTLTVLDLVLVLPFFDYDIRLYSKGVKTEL 300
QY 301 TRDIFTDPIFSLNTLQEGYPTFLSIENSIRKPHLPDYLOQIEFHTRLQPGYFGKDSFNW 360
DB 301 TRDIFTDPIFSLNTLQEGYPTFLSIENSIRKPHLPDYLOQIEFHTRLQPGYFGKDSFNW 360
QY 361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVKLSFDGOKVYRTTANTDVAAPNCKVYL 420
DB 361 SGNVYETRPSIGSSKTIITSPFYGDKSTPEVKLSFDGOKVYRTTANTDVAAPNCKVYL 420
QY 421 VTKVDFSQYDDQKNETSTQTYDSKRNHVSQAQSIDQLPETTDEPLEKAYSHQLNVAE 480
DB 421 VTKVDFSQYDDQKNETSTQTYDSKRNHVSQAQSIDQLPETTDEPLEKAYSHQLNVAE 480
QY 481 CFLMQDRRGTTIPFFTWTHRSVDFNTIDAETIKITQLPVVKAYALSSGASIIEGPGTGNL 540
DB 481 CFLMQDRRGTTIPFFTWTHRSVDFNTIDAETIKITQLPVVKAYALSSGASIIEGPGTGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRIRYASTTNLRLFVQNSNNDPLVIYINKTNK 600
DB 541 LFLKSSNSIAKFKVTLNSAALLQRYRIRYASTTNLRLFVQNSNNDPLVIYINKTNK 600
QY 601 DDDLTYTQTFDLATTNSNMGFSQDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
DB 601 DDDLTYTQTFDLATTNSNMGFSQDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652

RESULT 26
AAY23201
ID AAY23201 standard; protein; 652 AA.
XX
AC AAY232201;
XX
XX 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11081 polypeptide.
XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-Al.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-009931170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX
XX WPI; 1999-395184/33.
DR
XX Insecticidal Bacillus thuringiensis proteins.
XX
XX
PS Claim 39; Page 435-437; 512pp; English.
XX
XX
CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from amino acids 1-365 of the unmodified
CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

CC polypeptide was modified to have improved insecticidal activity or
 CC enhanced insecticidal specificity against a target insect. The
 CC modification comprises at least one amino acid substitution, addition, or
 CC deletion in the primary sequence of the native or unmodified Cry3Bb
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from about amino acids 1-365 of the unmodified
 CC polypeptide sequence (AA23207 represents the wild type Cry3Bb protein).
 CC The polypeptide can be used to kill coleopteran pests, especially by
 CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
 CC howardi Barber, and Diabrotica virgifera vergifera Leconte respectively).
 CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance
 XX
 SQ Sequence 652 AA;

Query Match 99.6%; Score 3392; DB 2; Length 652;
 Best Local Similarity 99.5%; Pred. No. 1.1e-275;
 Matches 649; Conservative 2; Mismatches 1; Indels 0; Gaps 0;
 QY 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTESSSTEVLDS 60
 DB 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTESSSTEVLDS 60
 QY 61 TVKDAVGTGIVGVQIILGVGVPPAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
 DB 61 TVKDAVGTGIVGVQIILGVGVPPAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
 QY 121 KIEEYAKSKALAELOGLNQNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
 DB 121 KIEEYAKSKALAELOGLNQNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
 QY 181 SMPFSAVSKFEVLFLPTYAAQANTHLLKDAQVFGEEWGYSSDEVAEPYHROLKLTQQY 240
 DB 181 SMPFSAVSKFEVLFLPTYAAQANTHLLKDAQVFGEEWGYSSDEVAEPYHROLKLTQQY 240
 QY 241 TDHCVNMYNVLNGLRGSTYDAWKFNFRREMTLTVDLILVLPFFYDIRLSKGVKTEL 300
 DB 241 TDHCVNMYNVLNGLRGSTYDAWKFNFRREMTLTVDLILVLPFFYDIRLSKGVKTEL 300
 QY 301 TRDIFTDPIPLNTLOKYGTFELSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNYW 360
 DB 301 TRDIFTDPIPLNTLOKYGTFELSIENSIRKPHLFDYLOGIEFHTRLQPGYFGKDSFNYW 360
 QY 361 SGNVETRPISGSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 420
 DB 361 SGNVETRPISGSKTITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 420
 QY 421 VTKVDFSYDDQKNETSTQTYDSKRNGHVSQAQSDIDQLPETTDEPLEKAYSHQLNYAE 480
 DB 421 VTKVDFSYDDQKNETSTQTYDSKRNGHVSQAQSDIDQLPETTDEPLEKAYSHQLNYAE 480
 QY 481 CFLMDRRGTIPPTWTHRSVDPEFTNTDAEKITQLPVKAYALSSGASIIIEGFGTGGNL 540
 DB 481 CFLMDRRGTIPPTWTHRSVDPEFTNTDAEKITQLPVKAYALSSGASIIIEGFGTGGNL 540
 QY 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIVINKTMNK 600
 DB 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIVINKTMNK 600
 QY 601 DDDLTYQTFDLATNSNMGSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652
 DB 601 DDDLTYQTFDLATNSNMGSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652

RESULT 27
 AAY23186
 ID AAY23186 standard; protein; 652 AA.

XX AAY23186;

XX 24-AUG-1999 (first entry)

DE Amino acid sequence of Cry3Bb.11235 polypeptide.
 XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
 KW coleoptera; southern corn rootworm; western corn root worm;
 KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
 KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
 XX Synthetic.
 OS Bacillus thuringiensis.
 XX
 PN W09931248-A1.
 XX
 PD 24-JUN-1999.
 XX
 PF 17-DEC-1998; 98MO-US026852.
 XX
 PR 18-DEC-1997; 97US-00993170.
 PR 18-DEC-1997; 97US-00993722.
 PR 18-DEC-1997; 97US-00993775.
 PR 18-DEC-1997; 97US-00996441.
 XX
 PA (ECOG-) ECOGEN INC.
 PA (MONS) MONSANTO CO.
 XX
 PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
 PI Walters FS, Slatin SL, Von Terech MA, Romano C;
 XX
 XX WPI; 1999-395184/33.
 XX
 XX Insecticidal Bacillus thuringiensis proteins.
 PT
 PS Claim 39; Page 351-353; 512pp; English.
 XX
 CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
 CC Cry3Bb mutant proteins. The specification also describes methods of
 CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
 CC polypeptide was modified to have improved insecticidal activity or
 CC enhanced insecticidal specificity against a target insect. The
 CC modification comprises at least one amino acid substitution, addition, or
 CC deletion in the primary sequence of the native or unmodified Cry3Bb
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from about amino acids 1-365 of the unmodified
 CC polypeptide sequence (AA23207 represents the wild type Cry3Bb protein).
 CC The polypeptide can be used to kill coleopteran pests, especially by
 CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
 CC howardi Barber, and Diabrotica virgifera vergifera Leconte respectively).
 CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance
 XX
 SQ Sequence 652 AA;

Query Match 99.6%; Score 3392; DB 2; Length 652;
 Best Local Similarity 99.7%; Pred. No. 1.1e-275;
 Matches 650; Conservative 0; Mismatches 2; Indels 0; Gaps 0;
 QY 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTESSSTEVLDS 60
 DB 1 MNPNNRSEHDTIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTESSSTEVLDS 60
 QY 61 TVKDAVGTGIVGVQIILGVGVPPAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
 DB 61 TVKDAVGTGIVGVQIILGVGVPPAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
 QY 121 KIEEYAKSKALAELOGLNQNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
 DB 121 KIEEYAKSKALAELOGLNQNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
 QY 181 SMPFSAVSKFEVLFLPTYAAQANTHLLKDAQVFGEEWGYSSDEVAEPYHROLKLTQQY 240
 DB 181 SMPFSAVSKFEVLFLPTYAAQANTHLLKDAQVFGEEWGYSSDEVAEPYHROLKLTQQY 240
 QY 241 TDHCVNMYNVLNGLRGSTYDAWKFNFRREMTLTVDLILVLPFFYDIRLSKGVKTEL 300

Db 241 TDHCNNWYNGVGLRGSTYDAWVFNFRREMTLVLDLVLFFFDYRILYSGVKTEL 300
QY 301 TRDIFTDFISLNTLQEGPTFLSIENSRKPHLFDYLGIEFHTRLQPGYFGKDSFNW 360
Db 301 TRDIFTDFISLNTLQEGPTFLSIENSRKPHLFDYLGIEFHTRLQPGYFGKDSFNW 360
QY 361 SGNVETRPSIGSSKTIITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAAMPNGKVYL 420
Db 361 SGNVETRPSIGSSKTIITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAAMPNGKVYL 420
QY 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQNLV 480
Db 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQNLV 480
QY 481 CFLMDRRGTIPFFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNL 540
Db 481 CFLMDRRGTIPFFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
Db 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
QY 601 DDDLTYQTFDLATNTSNMGFSGDKNELIIIGAESFVSNEKIYIDKIEFIPVOL 652
Db 601 DDDLTYQTFDLATNTSNMGFSGDKNELIIIGAESFVSNEKIYIDKIEFIPVOL 652

RESULT 28
AAV23179
ID AAY23179 standard; protein; 652 AA.
AC AAY23179;
DT 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11228 polypeptide.
XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera verigifera LeConte; insecticide resistance.

XX Synthetic.
OS Bacillus thuringiensis.
XX W0931248-A1.
XX 24-JUN-1999.
XX 17-DEC-1998; 98WO-US026852.
XX 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.

XX Insecticidal Bacillus thuringiensis proteins.
XX Claim 39; Page 311-313; 512pp; English.
XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or

CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera verigifera leconte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.5%; Score 3390; DB 2; Length 652;
Best Local Similarity 99.5%; Pred. No. 1.6e-275;
Matches 649; Conservative 1; Mismatches 2; Indels 0; Gaps 0;

QY 1 MNPNNRSHDITIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSSSTEVLDNS 60
Db 1 MNPNNRSHDITIKVTPNSELQTNHNOYPLADNPNSTLEELNYKEFLRMTEDSSSTEVLDNS 60
QY 61 TVKDAVGTGISVVGQILGVGVPPFAGALTSPYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
Db 61 TVKDAVGTGISVVGQILGVGVPPFAGALTSPYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEYAKSKALAEIQLQNNFEDYVNALNSWKTKPLSLRSKRSODRIEELSQAESHFRN 180
Db 121 KIEYAKSKALAEIQLQNNFEDYVNALNSWKTKPLSLRSKRSODRIEELSQAESHFRN 180
QY 181 SMPSFVSKFEVLFLPTYAQAANTHLLLLKDAQVGEWGYSSDEVAFYHRLKLTQY 240
Db 181 SMPSFVSKFEVLFLPTYAQAANTHLLLLKDAQVGEWGYSSDEVAFYHRLKLTQY 240
QY 241 TDHCNNWYNGVGLRGSTYDAWVFNFRREMTLVLDLVLFFFDYRILYSGVKTEL 300
Db 241 TDHCNNWYNGVGLRGSTYDAWVFNFRREMTLVLDLVLFFFDYRILYSGVKTEL 300
QY 301 TRDIFTDFISLNTLQEGPTFLSIENSRKPHLFDYLGIEFHTRLQPGYFGKDSFNW 360
Db 301 TRDIFTDFISLNTLQEGPTFLSIENSRKPHLFDYLGIEFHTRLQPGYFGKDSFNW 360
QY 361 SGNVETRPSIGSSKTIITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAAMPNGKVYL 420
Db 361 SGNVETRPSIGSSKTIITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAAMPNGKVYL 420
QY 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQNLV 480
Db 421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQNLV 480
QY 481 CFLMDRRGTIPFFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNL 540
Db 481 CFLMDRRGTIPFFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
Db 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
QY 601 DDDLTYQTFDLATNTSNMGFSGDKNELIIIGAESFVSNEKIYIDKIEFIPVOL 652
Db 601 DDDLTYQTFDLATNTSNMGFSGDKNELIIIGAESFVSNEKIYIDKIEFIPVOL 652

RESULT 29
AAV23191
ID AAY23191 standard; protein; 652 AA.
XX
AC AAY23191;
DT 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11241 polypeptide.

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XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
XX WO9931248-A1.
XX
XX 24-JUN-1999.
XX
XX 17-DEC-1998; 98WO-US026852.
XX
XX 18-DEC-1997; 97US-00993170.
XX 18-DEC-1997; 97US-00993722.
XX 18-DEC-1997; 97US-00993775.
XX 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
XX (MONS ) MONSANTO CO.
XX
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
XX Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
XX
XX Claim 39; Page 379-381; 512pp; English.
XX
XX AAX23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from amino acids 1-365 of the unmodified
CC polypeptide sequence (AAX23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
XX Sequence 652 AA;
XX
XX Query Match 99.5%; Score 3390; DB 2; Length 652;
XX Best Local Similarity 99.5%; Pred. No. 1.6e-275;
XX Matches 649; Conservative 2; Mismatches 1; Indels 0; Gaps 0;
XX
XX 1 MNPNNRSEHDTIKVTPNSELQTHNQYPLADNPNSTLEELNYKEFLRWTEDSSTVLNDS 60
XX |||||||
XX 1 MNPNNRSEHDTIKVTPNSELQTHNQYPLADNPNSTLEELNYKEFLRWTEDSSTVLNDS 60
XX
XX 61 TVKDAVGTGISVVGQILGVGVFPAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
XX |||||||
XX 61 TVKDAVGTGISVVGQILGVGVFPAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
XX
XX 121 KIEEYAKSKALAEQLQGNPFEDVYNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFN 180
XX |||||||
XX 121 KIEEYAKSKALAEQLQGNPFEDVYNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFN 180
XX
XX 181 SMPSFVSKFEVLPLPYTAQAANTHLILLKDAQVFGGEWGYSSDVAEFVHROKLTKQY 240
XX |||||||
XX 181 SMPSFVSKFEVLPLPYTAQAANTHLILLKDAQVFGGEWGYSSDVAEFVHROKLTKQY 240
XX
XX 241 TDHCVNMYNVGLNGRGSTYDAWVKFNFRREMTLTVDLILVFPFFNILLYSGVKTEL 300
XX |||||||

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Db 241 TDHCVNMYNVGLNGRGSTYDAWVKFNFRREMTLTVDLILVFPFFNILLYSGVKTEL 300
Qy 301 TRDIFTDFPISLNTLOEYGTPELSIENSIRKPHLFDYLOGIEFHTLQPCYFGKDSFNW 360
Db 301 TRDIFTDFPISLNTLOEYGTPELSIENSIRKPHLFDYLOGIEFHTLQPCYFGKDSFNW 360
Qy 361 SGNVETRPSIGSSKTIITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAAPNGKYVLG 420
Db 361 SGNVETRPSIGSSKTIITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAAPNGKYVLG 420
Qy 421 VTKVDFSQYDDQKNSTSTQTYDSKRNNGHVSAODSIDQLPPETDPLEKAYSHQLNYAE 480
Db 421 VTKVDFSQYDDQKNSTSTQTYDSKRNNGHVSAODSIDQLPPETDPLEKAYSHQLNYAE 480
Qy 481 CFLMQDRRGTIPFTTWTSHRSVDFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGNNL 540
Db 481 CFLMQDRRGTIPFTTWTSHRSVDFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGNNL 540
Qy 541 LFLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
Db 541 LFLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
Qy 601 DDDLTYYQTFDLATNSNMGFSGDKNELIIGASFVSNKIIYIDKIFIPVQL 652
Db 601 DDDLTYYQTFDLATNSNMGFSGDKNELIIGASFVSNKIIYIDKIFIPVQL 652

RESULT 30
AAX23180
ID AAX23180 standard; protein; 652 AA.
XX
XX AAX23180;
XX
XX 24-AUG-1999 (first entry)
XX
XX Amino acid sequence of Cry3Bb.11229 polypeptide.
XX
XX Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX
XX Synthetic.
XX Bacillus thuringiensis.
XX
XX WO9931248-A1.
XX
XX 24-JUN-1999.
XX
XX 17-DEC-1998; 98WO-US026852.
XX
XX 18-DEC-1997; 97US-00993170.
XX 18-DEC-1997; 97US-00993722.
XX 18-DEC-1997; 97US-00993775.
XX 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
XX (MONS ) MONSANTO CO.
XX
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
XX Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
XX
XX Claim 39; Page 317-319; 512pp; English.
XX
XX AAX23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from amino acids 1-365 of the unmodified
CC polypeptide sequence (AAX23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
XX Sequence 652 AA;
XX
XX Query Match 99.5%; Score 3390; DB 2; Length 652;
XX Best Local Similarity 99.5%; Pred. No. 1.6e-275;
XX Matches 649; Conservative 2; Mismatches 1; Indels 0; Gaps 0;
XX
XX 1 MNPNNRSEHDTIKVTPNSELQTHNQYPLADNPNSTLEELNYKEFLRWTEDSSTVLNDS 60
XX |||||||
XX 1 MNPNNRSEHDTIKVTPNSELQTHNQYPLADNPNSTLEELNYKEFLRWTEDSSTVLNDS 60
XX
XX 61 TVKDAVGTGISVVGQILGVGVFPAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
XX |||||||
XX 61 TVKDAVGTGISVVGQILGVGVFPAGALTSFYQSFLNTIWPSSDADPWKAFMAQVEVLIDK 120
XX
XX 121 KIEEYAKSKALAEQLQGNPFEDVYNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFN 180
XX |||||||
XX 121 KIEEYAKSKALAEQLQGNPFEDVYNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFN 180
XX
XX 181 SMPSFVSKFEVLPLPYTAQAANTHLILLKDAQVFGGEWGYSSDVAEFVHROKLTKQY 240
XX |||||||
XX 181 SMPSFVSKFEVLPLPYTAQAANTHLILLKDAQVFGGEWGYSSDVAEFVHROKLTKQY 240
XX
XX 241 TDHCVNMYNVGLNGRGSTYDAWVKFNFRREMTLTVDLILVFPFFNILLYSGVKTEL 300
XX |||||||

```

CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.5%; Score 3390; DB 2; Length 652;
Best Local Similarity 99.5%; Pred. No. 1.6e-275;
Matches 649; Conservative 2; Mismatches 1; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELQTNHNYQLADNPSTLEELNYKEFLRMTEDESSTVLDNS 60
Db 1 MNPNNRSEHDTIKVTPNSELQTNHNYQLADNPSTLEELNYKEFLRMTEDESSTVLDNS 60
QY 61 TVKDAVGTGISVVGQILGVGVFPFAGALTSFYQSFNTIWPDSADPWKAFMAQVEVLIDK 120
Db 61 TVKDAVGTGISVVGQILGVGVFPFAGALTSFYQSFNTIWPDSADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKTPLSLRKSQDRIRFLFSQAESHFN 180
Db 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKTPLSLRKSQDRIRFLFSQAESHFN 180
QY 181 SMPSPAVSKFEVLFLPTVAQAANTHLLKDAQVGEEMGYSSDVAEPHYRQLKLTQY 240
Db 181 SMPSPAVSKFEVLFLPTVAQAANTHLLKDAQVGEEMGYSSDVAEPHYRQLKLTQY 240
QY 241 TDHCNVNMYNVLNGLRGSTYDAWVKNFRFRREMTLVLDLIVLFPFYDIRLYSKGVKTEL 300
Db 241 TDHCNVNMYNVLNGLRGSTYDAWVKNFRFRREMTLVLDLIVLFPFYDIRLYSKGVKTEL 300
QY 301 TRDIETDPIFTLNTLQKCGFTLSLNSIRKPHLFDYLGQIFPHTLQPGYFGKDSFNW 360
Db 301 TRDIETDPIFTLNTLQKCGFTLSLNSIRKPHLFDYLGQIFPHTLQPGYFGKDSFNW 360
QY 361 SGNYVETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAMPNGKVILG 420
Db 361 SGNYVETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAMPNGKVILG 420
QY 421 VTKVDFSQVDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPETDEPLEKAYSHQLNVAE 480
Db 421 VTKVDFSQVDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPETDEPLEKAYSHQLNVAE 480
QY 481 CFMDDRRCTIPFTWTHRSVDFNTIDAETITOLPVVKAYALSSGASTIEGPGFTGGNL 540
Db 481 CFMDDRRCTIPFTWTHRSVDFNTIDAETITOLPVVKAYALSSGASTIEGPGFTGGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLFLVQNSNNDPLVIYINKTNWK 600
Db 541 LFLKSSNSIAKFKVTLNSAALLQRYRVRIRYASTTNLFLVQNSNNDPLVIYINKTNWK 600
QY 601 DDDLTVTQTPDLATNSMFGSGDKNELIIGASFSVSNKIIYIDKIEFIPVOL 652
Db 601 DDDLTVTQTPDLATNSMFGSGDKNELIIGASFSVSNKIIYIDKIEFIPVOL 652

RESULT 31
ID AAY23173 standard; protein; 652 AA.
XX AAY23173;
AC AAY23173;
DT 24-AUG-1999 (first entry)
XX Amino acid sequence of Cry3Bb.11222 polypeptide.
DE
XX

KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX Synthetic.
OS Bacillus thuringiensis.
XX WO9931248-A1.
XX 24-JUN-1999.
PD 17-DEC-1998; 98WO-US026852.
PF 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch NA, Romano C;
XX WPI; 1999-395184/33.
DR Insecticidal Bacillus thuringiensis proteins.
XX Claim 39; Page 277-280; 512pp; English.
XX AAV23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.5%; Score 3389; DB 2; Length 652;
Best Local Similarity 99.7%; Pred. No. 2e-275;
Matches 650; Conservative 0; Mismatches 2; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELQTNHNYQLADNPSTLEELNYKEFLRMTEDESSTVLDNS 60
Db 1 MNPNNRSEHDTIKVTPNSELQTNHNYQLADNPSTLEELNYKEFLRMTEDESSTVLDNS 60
QY 61 TVKDAVGTGISVVGQILGVGVFPFAGALTSFYQSFNTIWPDSADPWKAFMAQVEVLIDK 120
Db 61 TVKDAVGTGISVVGQILGVGVFPFAGALTSFYQSFNTIWPDSADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKTPLSLRKSQDRIRFLFSQAESHFN 180
Db 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKTPLSLRKSQDRIRFLFSQAESHFN 180
QY 181 SMPSPAVSKFEVLFLPTVAQAANTHLLKDAQVGEEMGYSSDVAEPHYRQLKLTQY 240
Db 181 SMPSPAVSKFEVLFLPTVAQAANTHLLKDAQVGEEMGYSSDVAEPHYRQLKLTQY 240
QY 241 TDHCNVNMYNVLNGLRGSTYDAWVKNFRFRREMTLVLDLIVLFPFYDIRLYSKGVKTEL 300
Db 241 TDHCNVNMYNVLNGLRGSTYDAWVKNFRFRREMTLVLDLIVLFPFYDIRLYSKGVKTEL 300

QY 301 TRDIFTDPIFSLNTLOEYGTFFLSIENSIRKPHLFDYLOGIEFHTRLOPGYFGKDSFNYW 360
 DB 301 TRDIFTDPIFSLNTLOEYGTFFLSIENSIRKPHLFDYLOGIEFHTRLOPGYFGKDSFNYW 360
 QY 361 SGNVETRPISIGSKTITSPFYGDKSTPEPVOKLSFDGQKYVRTTANTDVAAMPNGKVYLG 420
 DB 361 SGNVETRPISIGSKTITSPFYGDKSTPEPVOKLSFDGQKYVRTTANTDVAAMPNGKVYLG 420
 QY 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAODSIDOLPPETDDEPLEKAYSHQNLNAYE 480
 DB 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAODSIDOLPPETDDEPLEKAYSHQNLNAYE 480
 QY 481 CFLMQDRRGITPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
 DB 481 CFLMQDRRGITPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
 QY 541 LFLKESSENSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 DB 541 LFLKESSENSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 QY 601 DDDLTYQTFDLATTNSNMGFSQDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
 DB 601 DDDLTYQTFDLATTNSNMGFSQDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
 RESULT 32
 AAY23197
 ID AAY23197 standard; protein; 651 AA.
 AC AAY23197;
 XX
 DT 24-AUG-1999 (first entry)
 XX
 DE Amino acid sequence of Cry3Bb.11048 polypeptide.
 XX
 KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
 KW coleoptera; southern corn rootworm; western corn root worm;
 KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
 KW Diabrotica virgifera verigifera LeConte; insecticide resistance.
 XX
 OS Synthetic.
 OS Bacillus thuringiensis.
 XX
 XX WO9931248-A1.
 XX
 XX 24-JUN-1999.
 XX
 XX 17-DEC-1998; 98WO-US026852.
 XX
 XX 18-DEC-1997; 97US-00993170.
 PR 18-DEC-1997; 97US-00993722.
 PR 18-DEC-1997; 97US-00993775.
 PR 18-DEC-1997; 97US-00996441.
 XX
 XX (ECOG-) ECOGEN INC.
 PA (MONS) MONSANTO CO.
 XX
 XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
 PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
 XX WPI; 1999-395184/33.
 XX
 XX Insecticidal Bacillus thuringiensis proteins.
 PT
 XX
 PS Claim 39; Page 412-415; 512pp; English.
 XX
 CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
 CC Cry3Bb mutant proteins. The specification also describes methods of
 CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
 CC polypeptide was modified to have improved insecticidal activity or
 CC enhanced insecticidal specificity against a target insect. The
 CC modification comprises at least one amino acid substitution, addition, or

CC deletion in the primary sequence of the native or unmodified Cry3Bb
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from about amino acids 1-365 of the unmodified
 CC polypeptide sequence (AA23207 represents the wild type Cry3Bb protein).
 CC The polypeptide can be used to kill coleopteran pests, especially by
 CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
 CC howardi Barber, and Diabrotica virgifera verigifera LeConte respectively).
 CC The mutant cry3bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance
 XX
 SQ Sequence 651 AA;
 Query Match 99.5%; Score 3387.5; DB 2; Length 651;
 Best Local Similarity 99.7%; Pred. No. 2.6e-275;
 Matches 650; Conservative 1; Mismatches 0; Indels 1; Gaps 1;
 QY 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPSTLEELNYKEFLRMTEDSSTEVLDNS 60
 DB 1 MNPNNRSEHDTIKVTNPSELQTNHNOYPLADNPSTLEELNYKEFLRMTEDSSTEVLDNS 60
 QY 61 TVKDAVGTGISVVGQILGVGVGPFAGALTSFYQSFLNTIWPSE-DPWKAFMAQVEVLIDK 120
 DB 61 TVKDAVGTGISVVGQILGVGVGPFAGALTSFYQSFLNTIWPSE-DPWKAFMAQVEVLIDK 119
 QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDRIRELFSQAESHFRN 180
 DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDRIRELFSQAESHFRN 179
 QY 181 SMPFAVSKEVLFLPTYAQAANTHLLLLKDAQVGEEMGYSSSEDVAEFYHRQLKTOQY 240
 DB 181 SMPFAVSKEVLFLPTYAQAANTHLLLLKDAQVGEEMGYSSSEDVAEFYHRQLKTOQY 239
 QY 241 THCVNMYNVLNGLRGSTYDAWKKNRFRREMTLVLDLIVLFPFYDIRLYSKGVKTEL 300
 DB 241 THCVNMYNVLNGLRGSTYDAWKKNRFRREMTLVLDLIVLFPFYDIRLYSKGVKTEL 299
 QY 301 TRDIFTDPIFSLNTLOEYGTFFLSIENSIRKPHLFDYLOGIEFHTRLOPGYFGKDSFNYW 360
 DB 301 TRDIFTDPIFSLNTLOEYGTFFLSIENSIRKPHLFDYLOGIEFHTRLOPGYFGKDSFNYW 359
 QY 361 SGNVETRPISIGSKTITSPFYGDKSTPEPVOKLSFDGQKYVRTTANTDVAAMPNGKVYLG 420
 DB 361 SGNVETRPISIGSKTITSPFYGDKSTPEPVOKLSFDGQKYVRTTANTDVAAMPNGKVYLG 419
 QY 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAODSIDOLPPETDDEPLEKAYSHQNLNAYE 480
 DB 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAODSIDOLPPETDDEPLEKAYSHQNLNAYE 479
 QY 481 CFLMQDRRGITPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
 DB 481 CFLMQDRRGITPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGGNL 539
 QY 541 LFLKESSENSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 DB 541 LFLKESSENSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 599
 QY 601 DDDLTYQTFDLATTNSNMGFSQDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
 DB 601 DDDLTYQTFDLATTNSNMGFSQDKNELIIGAESFVSNEKIYIDKIEFIPVOL 651
 RESULT 33
 AAY23183
 ID AAY23183 standard; protein; 652 AA.
 AC AAY23183;
 XX
 DT 24-AUG-1999 (first entry)
 XX
 DE Amino acid sequence of Cry3Bb.11232 polypeptide.
 XX
 KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;

KW	coileoptera; southern corn rootworm; western corn root worm;	
KW	Diabrotica undecimpunctata howardi Barber; transgenic plant;	
KW	Diabrotica virgifera LeConte; insecticide resistance.	
OS	Synthetic.	
OS	Bacillus thuringiensis.	
XX		
FN	WO9931248-A1.	
XX		
PD	24-JUN-1999.	
XX		
PF	17-DEC-1998; 98WO-US026852.	
XX		
PR	18-DEC-1997; 97US-00993170.	
PR	18-DEC-1997; 97US-00993722.	
PR	18-DEC-1997; 97US-00993775.	
PR	18-DEC-1997; 97US-00996441.	
XX		
XX	(ECOG-) ECOGEN INC.	
PA	(MONS) MONSANTO CO.	
XX		
XX	English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;	
PI	Walters FS, Slatin SL, Von Tersch MA, Romano C;	
XX	WPI; 1999-395184/33.	
XX		
PT	Insecticidal Bacillus thuringiensis proteins.	
XX		
PS	Claim 39; Page 334-336; 512pp; English.	
XX		
CC	AA23172-Y23206, and AA23208-X23209 represent new Bacillus thuringiensis	
CC	Cry3Bb mutant proteins. The specification also describes methods of	
CC	altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb	
CC	polypeptide was modified to have improved insecticidal activity or	
CC	enhanced insecticidal specificity against a target insect. The	
CC	modification comprises at least one amino acid substitution, addition, or	
CC	deletion in the primary sequence of the native or unmodified Cry3Bb	
CC	polypeptide, wherein the substitution or deletion occurs at a position	
CC	corresponding to from about amino acids 1-365 of the unmodified	
CC	polypeptide sequence (AA23207 represents the wild type Cry3Bb protein).	
CC	The polypeptide can be used to kill coleopteran pests, especially by	
CC	application to the environment. It is especially useful against southern	
CC	corn rootworm and western corn root worm, (Diabrotica undecimpunctata	
CC	howardi Barber, and Diabrotica virgifera LeConte respectively).	
CC	The mutant cry3Bb polynucleotides can also be used to produce transgenic	
CC	plants with increased insecticide resistance	
XX		
SQ	Sequence 652 AA;	
	Query Match 99.4%; Score 3387; DB 2; Length 652;	
	Best Local Similarity 99.4%; Pred. No. 2.9e-275;	
	Matches 648; Conservative 2; Mismatches 2; Indels 0; Gaps 0;	
QY	1 MNPNRSEHDTIKVTNSELQTNHNYPLADNPSTLEELNYKEFLRMTEDSSTEVLDS 60	
DB	1 MNPNRSEHDTIKVTNSELQTNHNYPLADNPSTLEELNYKEFLRMTEDSSTEVLDS 60	
QY	61 TVKDVGTSVVGQILGVGVFPFAGALTSFYQSFLNTWPSDADPWKAFMAQVEVLIDK 120	
DB	61 TVKDVGTSVVGQILGVGVFPFAGALTSFYQSFLNTWPSDADPWKAFMAQVEVLIDK 120	
QY	121 KIEEYAKSALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLEFSAQESHFRN 180	
DB	121 KIEEYAKSALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLEFSAQESHFRN 180	
QY	181 SMPSFVSKFEVLFLPTYAQAANTHLLLLKDAQVGEWGYSSSEDVAEFTHROLKLTQOY 240	
DB	181 SMPSFVSKFEVLFLPTYAQAANTHLLLLKDAQVGEWGYSSSEDVAEFTHROLKLTQOY 240	
QY	241 TDHCVMWYNVGLNGLRGSTYDAWVKNRFRREMTLTVDLVLFPFVDRLYSGVKTEL 300	
DB	241 TDHCVMWYNVGLNGLRGSTYDAWVKNRFRREMTLTVDLVLFPFVDRLYSGVKTEL 300	

QY	301 TRDIFTDPFSLNTLOEYGTFFLSIENSIRKPHLFDYLOGIEFHTRLPQGVFGKDSFNW 360	
DB	301 TRDIFTDPFIPPTLQDYGTFFLSIENSIRKPHLFDYLOGIEFHTRLPQGVFGKDSFNW 360	
QY	361 SGNVETRPISGSKTITSPFYGDKSTPEVOKLSFDGQKVYRTTANTDVAAMPNGKVYLG 420	
DB	361 SGNVETRPISGSKTITSPFYGDKSTPEVOKLSFDGQKVYRTTANTDVAAMPNGKVYLG 420	
QY	421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPETTDEPLEKAYSHQLNVAE 480	
DB	421 VTKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPETTDEPLEKAYSHQLNVAE 480	
QY	481 CFLMDRRGTIPPTFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNNL 540	
DB	481 CFLMDRRGTIPPTFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGNNL 540	
QY	541 LFLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLEPVQNSNDDFLVIYINKTMNK 600	
DB	541 LFLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLEPVQNSNDDFLVIYINKTMNK 600	
QY	601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652	
DB	601 DDDLTYQTFDLATTNSNMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652	
	RESULT 34	
	AA232174	
ID	AA232174 standard; protein; 652 AA.	
XX	AA232174;	
DT	24-AUG-1999 (first entry)	
DE	Amino acid sequence of Cry3Bb.11223 polypeptide.	
XX		
KW	Cry3Bb; mutant; insecticidal activity; insecticidal specificity;	
KW	coileoptera; southern corn rootworm; western corn root worm;	
KW	Diabrotica undecimpunctata howardi Barber; transgenic plant;	
KW	Diabrotica virgifera vergifera LeConte; insecticide resistance.	
XX		
OS	Synthetic.	
OS	Bacillus thuringiensis.	
XX		
PN	WO9931248-A1.	
PD	24-JUN-1999.	
XX		
PF	17-DEC-1998; 98WO-US026852.	
XX		
PR	18-DEC-1997; 97US-00993170.	
PR	18-DEC-1997; 97US-00993722.	
PR	18-DEC-1997; 97US-00993775.	
PR	18-DEC-1997; 97US-00996441.	
XX		
PA	(ECOG-) ECOGEN INC.	
PA	(MONS) MONSANTO CO.	
XX		
PI	English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;	
PI	Walters FS, Slatin SL, Von Tersch MA, Romano C;	
XX	WPI; 1999-395184/33.	
DR		
XX	Insecticidal Bacillus thuringiensis proteins.	
PT		
PS	Claim 39; Page 283-285; 512pp; English.	
XX		
CC	AA232172-Y23206, and AA23208-X23209 represent new Bacillus thuringiensis	
CC	Cry3Bb mutant proteins. The specification also describes methods of	
CC	altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb	
CC	polypeptide was modified to have improved insecticidal activity or	
CC	enhanced insecticidal specificity against a target insect. The	
CC	modification comprises at least one amino acid substitution, addition, or	
CC	deletion in the primary sequence of the native or unmodified Cry3Bb	
CC	polypeptide, wherein the substitution or deletion occurs at a position	
CC	corresponding to from about amino acids 1-365 of the unmodified	
CC	polypeptide sequence (AA23207 represents the wild type Cry3Bb protein).	
CC	The polypeptide can be used to kill coleopteran pests, especially by	
CC	application to the environment. It is especially useful against southern	
CC	corn rootworm and western corn root worm, (Diabrotica undecimpunctata	
CC	howardi Barber, and Diabrotica virgifera LeConte respectively).	
CC	The mutant cry3Bb polynucleotides can also be used to produce transgenic	
CC	plants with increased insecticide resistance	
XX		
SQ	Sequence 652 AA;	
	Query Match 99.4%; Score 3387; DB 2; Length 652;	
	Best Local Similarity 99.4%; Pred. No. 2.9e-275;	
	Matches 648; Conservative 2; Mismatches 2; Indels 0; Gaps 0;	
QY	1 MNPNRSEHDTIKVTNSELQTNHNYPLADNPSTLEELNYKEFLRMTEDSSTEVLDS 60	
DB	1 MNPNRSEHDTIKVTNSELQTNHNYPLADNPSTLEELNYKEFLRMTEDSSTEVLDS 60	
QY	61 TVKDVGTSVVGQILGVGVFPFAGALTSFYQSFLNTWPSDADPWKAFMAQVEVLIDK 120	
DB	61 TVKDVGTSVVGQILGVGVFPFAGALTSFYQSFLNTWPSDADPWKAFMAQVEVLIDK 120	
QY	121 KIEEYAKSALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLEFSAQESHFRN 180	
DB	121 KIEEYAKSALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLEFSAQESHFRN 180	
QY	181 SMPSFVSKFEVLFLPTYAQAANTHLLLLKDAQVGEWGYSSSEDVAEFTHROLKLTQOY 240	
DB	181 SMPSFVSKFEVLFLPTYAQAANTHLLLLKDAQVGEWGYSSSEDVAEFTHROLKLTQOY 240	
QY	241 TDHCVMWYNVGLNGLRGSTYDAWVKNRFRREMTLTVDLVLFPFVDRLYSGVKTEL 300	
DB	241 TDHCVMWYNVGLNGLRGSTYDAWVKNRFRREMTLTVDLVLFPFVDRLYSGVKTEL 300	

CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from about amino acids 1-365 of the unmodified
 CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
 CC The polypeptide can be used to kill coleopteran pests, especially by
 CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
 CC howardi Barber, and Diabrotica virgifera LeConte respectively).
 CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance
 XX
 SQ Sequence 652 AA;

Query Match 99.4%; Score 3386; DB 2; Length 652;
 Best Local Similarity 99.5%; Pred. No. 3.5e-275;
 Matches 649; Conservative 0; Mismatches 3; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSSTEVLDS 60
 DB 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSSTEVLDS 60
 QY 61 TVKDVGTCISVVGQILGVVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
 DB 61 TVKDVGTCISVVGQILGVVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
 QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
 DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
 QY 181 SMPSPFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGSEWGYSEDVAEFYHROKLTKQY 240
 DB 181 SMPSPFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGSEWGYSEDVAEFYHROKLTKQY 240
 QY 241 TDHCNVNWNVGLNGRGSTYDAMVKENFRREMTLTVDLILVLPFPYDRLYSKGVKTEL 300
 DB 241 TDHCNVNWNVGLNGRGSTYDAMVKENFRREMTLTVDLILVLPFPYDRLYSKGVKTEL 300
 QY 301 TRDIFTDPIFSLNTLQEGTFLSIENSIRKPHLFDYLOQIEPHTRLQPGYFGKDSFNW 360
 DB 301 TRDIFTDPIFSLNTLQEGTFLSIENSIRKPHLFDYLOQIEPHTRLQPGYFGKDSFNW 360
 QY 361 SGNYVETRPISGSKITSPFYGDKSTEPVQKLSFGQKQVYRTIANTDVAAMPNGKYYLG 420
 DB 361 SGNYVETRPISGSKITSPFYGDKSTEPVQKLSFGQKQVYRTIANTDVAAMPNGKYYLG 420
 QY 421 VTKVDFSOYDDQNETSTQYDSKRNGHVSADSIDQLPPETTDPLEKAYSHQNLNAYE 480
 DB 421 VTKVDFSOYDDQNETSTQYDSKRNGHVSADSIDQLPPETTDPLEKAYSHQNLNAYE 480
 QY 481 CFLMQDRRGITPFFTHTHRSVDFNTIDAETIKTQLPVKAYALSSGASIEGPGFTGNNL 540
 DB 481 CFLMQDRRGITPFFTHTHRSVDFNTIDAETIKTQLPVKAYALSSGASIEGPGFTGNNL 540
 QY 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTNLRILFVQNSNNDFLVIYINKTMNK 600
 DB 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTNLRILFVQNSNNDFLVIYINKTMNK 600
 QY 601 DDLTQTQTPDLATNSNMGFGDKNELIGAESFVSNKEIYIDKIFIPVOL 652
 DB 601 DDLTQTQTPDLATNSNMGFGDKNELIGAESFVSNKEIYIDKIFIPVOL 652

RESULT 35

AAV23185

ID AAV23185 standard; protein; 652 AA.

XX

AC AAV23185;

DT

24-AUG-1999 (first entry)

XX

DE Amino acid sequence of Cry3Bb.11234 polypeptide.

XX

KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;

KW coleoptera; southern corn rootworm; western corn root worm;

KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
 KW Diabrotica virgifera LeConte; insecticide resistance.

XX Synthetic.

OS Bacillus thuringiensis.

XX WO9931248-A1.

PN 24-JUN-1999.

XX

PF 17-DEC-1998; 98WO-US026852.

XX

PR 18-DEC-1997; 97US-00993170.

PR 18-DEC-1997; 97US-00993722.

PR 18-DEC-1997; 97US-00993775.

PR 18-DEC-1997; 97US-00996441.

XX (ECOG-) ECOGEN INC.

PA (MONS) MONSANTO CO.

XX

PI English L, Brussock SM, Malvar TM, Bryason JW, Kulesza CA;

PI Walters FS, Slatin SL, Von Tersch MA, Romano C;

XX WPI; 1999-395184/33.

XX Insecticidal Bacillus thuringiensis proteins.

PS Claim 39; Page 345-347; 512pp; English.

XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis

CC Cry3Bb mutant proteins. The specification also describes methods of

CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb

CC polypeptide was modified to have improved insecticidal activity or

CC enhanced insecticidal specificity against a target insect. The

CC modification comprises at least one amino acid substitution, addition, or

CC deletion in the primary sequence of the native or unmodified Cry3Bb

CC polypeptide, wherein the substitution or deletion occurs at a position

CC corresponding to from about amino acids 1-365 of the unmodified

CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).

CC The polypeptide can be used to kill coleopteran pests, especially by

CC application to the environment. It is especially useful against southern

CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata

CC howardi Barber, and Diabrotica virgifera LeConte respectively).

CC The mutant cry3Bb polynucleotides can also be used to produce transgenic

CC plants with increased insecticide resistance

XX

SQ Sequence 652 AA;

Query Match 99.4%; Score 3386; DB 2; Length 652;
 Best Local Similarity 99.4%; Pred. No. 3.5e-275;
 Matches 648; Conservative 1; Mismatches 3; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSSTEVLDS 60
 DB 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSSTEVLDS 60
 QY 61 TVKDVGTCISVVGQILGVVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
 DB 61 TVKDVGTCISVVGQILGVVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDK 120
 QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
 DB 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQAESHFRN 180
 QY 181 SMPSPFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGSEWGYSEDVAEFYHROKLTKQY 240
 DB 181 SMPSPFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGSEWGYSEDVAEFYHROKLTKQY 240
 QY 241 TDHCNVNWNVGLNGRGSTYDAMVKENFRREMTLTVDLILVLPFPYDRLYSKGVKTEL 300
 DB 241 TDHCNVNWNVGLNGRGSTYDAMVKENFRREMTLTVDLILVLPFPYDRLYSKGVKTEL 300
 QY 301 TRDIFTDPIFSLNTLQEGTFLSIENSIRKPHLFDYLOQIEPHTRLQPGYFGKDSFNW 360

Db 301 TRDIFTDFSLNTLQEVGPTFLSIENSRKPHLFDYLGIEFHTRLQGVFGKDSFNYW 360
Qy 361 SGNVETRPISGSSKTIITSPFFGDKSTPEVQKLSFDGQKQVYRTIANTDVAAPNGKVYL 420
Db 361 SGNVETRPISGSSKTIITSPFFGDKSTPEVQKLSFDGQKQVYRTIANTDVAAPNGKVYL 420
Qy 421 VTKVDFSOYDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQINVAE 480
Db 421 VTKVDFSOYDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQINVAE 480
Qy 481 CFLMDRRGTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
Db 481 CFLMDRRGTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
Qy 541 LFLKSSNSIAKFKVTLSAALLQRYRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
Db 541 LFLKSSNSIAKFKVTLSAALLQRYRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
Qy 601 DDDLTYQTDFDLATNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
Db 601 DDDLTYQTDFDLATNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652

RESULT 36
AAV231194
ID AAY231194 standard; protein; 652 AA.
AC AAY231194;
XX
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11035 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX

OS Synthetic.
OS Bacillus thuringiensis.
XX
XX W09931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, von Tersch MA, Romano C;
XX
XX WPI; 1999-395184/33.

Insecticidal Bacillus thuringiensis proteins.
XX
XX Claim 39; Page 396-398; 512pp; English.
XX
CC AAY231172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position

CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.4%; Score 3385; DB 2; Length 652;
Best Local Similarity 99.4%; Pred. No. 4.3e-275;
Matches 648; Conservative 1; Mismatches 3; Indels 0; Gaps 0;

Qy 1 MNPNNRSEHDIKVTPNSELQTNHNOYPLADNPSTLEELNYKEFLRMTEDSSSTEVLDS 60
Db 1 MNPNNRSEHDIKVTPNSELQTNHNOYPLADNPSTLEELNYKEFLRMTEDSSSTEVLDS 60
Qy 61 TVKDAVGTSVVGQILGVGVPPFAGALTSFQSFPLNTIWPSDADPWKAFMAQVEVLIDK 120
Db 61 TVKDAVGTSVVGQILGVGVPPFAGALTSFQSFPLNTIWPSDADPWKAFMAQVEVLIDK 120
Qy 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSDRIRELFSQAESHPFN 180
Db 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRNPHSQGRIRELFSQAESHPFN 180
Qy 181 SMPSPAVSKFEVLFLPTTAAQAAANTHLLLLKDAQVGEWGYSSSEDAVFYRHQLKLTQOY 240
Db 181 SMPSPAVSKFEVLFLPTTAAQAAANTHLLLLKDAQVGEWGYSSSEDAVFYRHQLKLTQOY 240
Qy 241 TDHCVNWNVNLGLRGSTYDAWKVFNFRREMTLTVLDLIVLFFPYDIRLYSKGVKTTEL 300
Db 241 TDHCVNWNVNLGLRGSTYDAWKVFNFRREMTLTVLDLIVLFFPYDIRLYSKGVKTTEL 300
Qy 301 TRDIFTDFISLNTLQEVGPTFLSIENSRKPHLFDYLGIEFHTRLQGVFGKDSFNYW 360
Db 301 TRDIFTDFISLNTLQEVGPTFLSIENSRKPHLFDYLGIEFHTRLQGVFGKDSFNYW 360
Qy 361 SGNVETRPISGSSKTIITSPFFGDKSTPEVQKLSFDGQKQVYRTIANTDVAAPNGKVYL 420
Db 361 SGNVETRPISGSSKTIITSPFFGDKSTPEVQKLSFDGQKQVYRTIANTDVAAPNGKVYL 420
Qy 421 VTKVDFSOYDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQINVAE 480
Db 421 VTKVDFSOYDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQINVAE 480
Qy 481 CFLMDRRGTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
Db 481 CFLMDRRGTIPFFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
Qy 541 LFLKSSNSIAKFKVTLSAALLQRYRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
Db 541 LFLKSSNSIAKFKVTLSAALLQRYRIRYASTTNLRLFVQNSNDFLVIYINKTMNK 600
Qy 601 DDDLTYQTDFDLATNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
Db 601 DDDLTYQTDFDLATNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652

RESULT 37
AAV231182
ID AAY231182 standard; protein; 652 AA.
XX
XX AAY231182;
AC
XX
XX 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11231 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;

KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
 XX Synthetic.
 OS Bacillus thuringiensis.
 XX WO9931248-A1.
 PN 24-JUN-1999.
 XX 17-DEC-1998; 98WO-US026852.
 XX 18-DEC-1997; 97US-00993170.
 PR 18-DEC-1997; 97US-00993722.
 PR 18-DEC-1997; 97US-00993775.
 PR 18-DEC-1997; 97US-00996441.
 XX (ECOG-) ECOGEN INC.
 PA (MONS) MONSANTO CO.
 XX English L, Brusseck SM, Malvar TM, Bryson JW, Kulesza CA;
 PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
 XX WPI; 1999-395184/33.
 DR Insecticidal Bacillus thuringiensis proteins.
 PT Claim 39; Page 328-330; 512pp; English.
 XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
 CC Cry3Bb mutant proteins. The specification also describes methods of
 CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
 CC polypeptide was modified to have improved insecticidal activity or
 CC enhanced insecticidal specificity against a target insect. The
 CC modification comprises at least one amino acid substitution, addition, or
 CC deletion in the primary sequence of the native or unmodified Cry3Bb
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from about amino acids 1-365 of the unmodified
 CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
 CC The polypeptide can be used to kill coleopteran pests, especially by
 CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
 CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
 CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance
 XX Sequence 652 AA;
 SQ
 Query Match 99.3%; Score 3382; DB 2; Length 652;
 Best Local Similarity 99.4%; Pred. No. 7.7e-275;
 Matches 648; Conservative 1; Mismatches 3; Indels 0; Gaps 0;
 QY 1 MNPNNRSEHDTIKVTNSELOTHNQYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLDS 60
 DB 1 MNPNNRSEHDTIKVTNSELOTHNQYPLADNPNSTLEELNYKEFLRMTEDSDSTEVLDS 60
 QY 61 TVKDAVGTGIVSVGQILGVGVFPFAGALTSFYOSFLNTIWPSDADPWKAFMAQVEVLIDK 120
 DB 61 TVKDAVGTGIVSVGQILGVGVFPFAGALTSFYOSFLNTIWPSDADPWKAFMAQVEVLIDK 120
 QY 121 KIEEYAKSKALAELOGLQNNFDYVNALNSWKKTPLSLRSKRSQDRIRLEFSAQESHFRN 180
 DB 121 KIEEYAKSKALAELOGLQNNFDYVNALNSWKKTPLSLRSKRSQDRIRLEFSAQESHFRN 180
 QY 181 SMPSFAVSKEVLFLPTYAQAAHTHLLLLKDAQVGEWGYSSYDAEPYHRLKLTQY 240
 DB 181 SMPSFAVSKEVLFLPTYAQAAHTHLLLLKDAQVGEWGYSSYDAEPYHRLKLTQY 240
 QY 241 TDHCVMNVNGLNGRGSTYDAWKFNRRPREMTLVLDLIVLPFPYDLRLXSGVKTEL 300
 DB 241 TDHCVMNVNGLNGRGSTYDAWKFNRRPREMTLVLDLIVLPFPYDLRLXSGVKTEL 300
 QY 301 TRDIFTDPIFSLTQEGYFTFLSIENSIKPKHLPDYLOGIEPHTRLQPCYFGKDSFNW 360
 DB 301 TRDIFTDPIFSLTQEGYFTFLSIENSIKPKHLPDYLOGIEPHTRLQPCYFGKDSFNW 360

Db 301 TRDIFTDPIFSLTQEGYFTFLSIENSIKPKHLPDYLOGIEPHTRLQPCYFGKDSFNW 360
 QY 361 SGNVETREPSIGSSKTTITSPFYGDKSTEPVOKLSFDGQKVYRTIANTDVAAWNGKVYLG 420
 Db 361 SGNVETREPSIGSSKTTITSPFYGDKSTEPVOKLSFDGQKVYRTIANTDVAAWNGKVYLG 420
 QY 421 VTKVDFSOYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDPELEKAYSHQLNYAE 480
 Db 421 VTKVDFSOYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTDPELEKAYSHQLNYAE 480
 QY 481 CFLMQDRRGTTIPFFTWTHRSVDFNTIDAETKLTQLPVVKAYALSSGASIEGPGFTGNNL 540
 Db 481 CFLMQDRRGTTIPFFTWTHRSVDFNTIDAETKLTQLPVVKAYALSSGASIEGPGFTGNNL 540
 QY 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRVASTTNLRLFVQNSNNDLVIYINKTMNK 600
 Db 541 LFLKSSNSIAKPKVTLNSAALLQRYRVRIRVASTTNLRLFVQNSNNDLVIYINKTMNK 600
 QY 601 DDDLTQYQTFDLATTNSNMGFGDKNELIIGAESFVSNKIIYIDKIFIPVQL 652
 Db 601 DDDLTQYQTFDLATTNSNMGFGDKNELIIGAESFVSNKIIYIDKIFIPVQL 652

RESULT 38
 AAY23190
 ID AAY23190 standard; protein; 652 AA.
 XX
 AC AAY23190;
 XX
 DT 24-AUG-1999 (first entry)
 XX
 DE Amino acid sequence of Cry3Bb.11239 polypeptide.
 XX
 KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
 KW coleoptera; southern corn rootworm; western corn root worm;
 KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
 KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
 XX Synthetic.
 OS Bacillus thuringiensis.
 XX WO9931248-A1.
 PN 24-JUN-1999.
 XX 17-DEC-1998; 98WO-US026852.
 XX 18-DEC-1997; 97US-00993170.
 PR 18-DEC-1997; 97US-00993722.
 PR 18-DEC-1997; 97US-00993775.
 PR 18-DEC-1997; 97US-00996441.
 XX (ECOG-) ECOGEN INC.
 PA (MONS) MONSANTO CO.
 XX English L, Brusseck SM, Malvar TM, Bryson JW, Kulesza CA;
 PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
 XX WPI; 1999-395184/33.
 DR Insecticidal Bacillus thuringiensis proteins.
 PT Claim 39; Page 373-375; 512pp; English.
 XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
 CC Cry3Bb mutant proteins. The specification also describes methods of
 CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
 CC polypeptide was modified to have improved insecticidal activity or
 CC enhanced insecticidal specificity against a target insect. The
 CC modification comprises at least one amino acid substitution, addition, or
 CC deletion in the primary sequence of the native or unmodified Cry3Bb
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from about amino acids 1-365 of the unmodified
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from about amino acids 1-365 of the unmodified

CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.2%; Score 3380; DB 2; Length 652;
Best Local Similarity 99.4%; Pred. No. 1.1e-274;
Matches 648; Conservative 0; Mismatches 4; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTESSSTEVLDS 60
Db 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTESSSTEVLDS 60
QY 61 TVKDAVGTGISVVGQILGVGVFPAGALTSTFYQSFLNTIWPSPDADPKAFMAQVEVLIDK 120
Db 61 TVKDAVGTGISVVGQILGVGVFPAGALTSTFYQSFLNTIWPSPDADPKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRSELFQAESHFRN 180
Db 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRSELFQAESHFRN 180
QY 181 SMPFAVSFEVLFLPTYAQAANTHLLKDAQVGEENGYSSEDAEFYHRLKLTQOY 240
Db 181 SMPFAVSFEVLFLPTYAQAANTHLLKDAQVGEENGYSSEDAEFYHRLKLTQOY 240
QY 241 TDHCNVNMYVGLNGLRSTYDAWVKFNFRREMTLTVDLIVLFPYDRLYSKGVKTEL 300
Db 241 TDHCNVNMYVGLNGLRSTYDAWVKFNFRREMTLTVDLIVLFPYDRLYSKGVKTEL 300
QY 301 TRDIFTDPIPSLNTLOEQYGTFLSIENSIRKPHLFDYLOGIEFHTRLOPGYFGKDSFNW 360
Db 301 TRDIFTDPIPSLNTLOEQYGTFLSIENSIRKPHLFDYLOGIEFHTRLOPGYFGKDSFNW 360
QY 361 SGNVETRPSIGSKTITSPFYGDKSTEPVKLSLSPGQKVYRTIANTDVAAMPNGKVILG 420
Db 361 SGNVETRPSIGSKTITSPFYGDKSTEPVKLSLSPGQKVYRTIANTDVAAMPNGKVILG 420
QY 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAQDSIDLQPPETTDEPLEKAYSHQLNVAE 480
Db 421 VTKVDFSQYDDQKNETSTQYDSKRNGHVSQAQDSIDLQPPETTDEPLEKAYSHQLNVAE 480
QY 481 CFLMDRRGTIPFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGFGTGGNL 540
Db 481 CFLMDRRGTIPFTWTHRSVDFNTIDAETITQLPVVKAYALSSGASIIIEGFGTGGNL 540
QY 541 LFLKSSNSIAKPKVTLSAALLQYRVRIRYASTTNLRLFQNSNNDPLVIYINKTNWK 600
Db 541 LFLKSSNSIAKPKVTLSAALLQYRVRIRYASTTNLRLFQNSNNDPLVIYINKTNWK 600
QY 601 DDDLTQTQFDLATTNSMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652
Db 601 DDDLTQTQFDLATTNSMGFSGDKNELIIGAESFVSNEKIYIDKIEFIPVQL 652

RESULT 39
AAV23189
ID AAV23189 standard; protein; 652 AA.
XX
AC AAV23189;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of Cry3Bb.11238 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera LeConte; insecticide resistance.

XX OS Synthetic.
OS Bacillus thuringiensis.
XX
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-009931170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Teresch MA, Romano C;
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
XX
PS Claim 39; Page 367-370; 512pp; English.
XX
CC AAV23172-Y23206, and AAX23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC polypeptide was modified to have improved insecticidal activity or
CC modification insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from amino acids 1-365 of the unmodified
CC polypeptide sequence (AAV23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

Query Match 99.2%; Score 3380; DB 2; Length 652;
Best Local Similarity 99.4%; Pred. No. 1.1e-274;
Matches 648; Conservative 0; Mismatches 4; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTESSSTEVLDS 60
Db 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTESSSTEVLDS 60
QY 61 TVKDAVGTGISVVGQILGVGVFPAGALTSTFYQSFLNTIWPSPDADPKAFMAQVEVLIDK 120
Db 61 TVKDAVGTGISVVGQILGVGVFPAGALTSTFYQSFLNTIWPSPDADPKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRSELFQAESHFRN 180
Db 121 KIEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRSELFQAESHFRN 180
QY 181 SMPFAVSFEVLFLPTYAQAANTHLLKDAQVGEENGYSSEDAEFYHRLKLTQOY 240
Db 181 SMPFAVSFEVLFLPTYAQAANTHLLKDAQVGEENGYSSEDAEFYHRLKLTQOY 240
QY 241 TDHCNVNMYVGLNGLRSTYDAWVKFNFRREMTLTVDLIVLFPYDRLYSKGVKTEL 300
Db 241 TDHCNVNMYVGLNGLRSTYDAWVKFNFRREMTLTVDLIVLFPYDRLYSKGVKTEL 300
QY 301 TRDIFTDPIPSLNTLOEQYGTFLSIENSIRKPHLFDYLOGIEFHTRLOPGYFGKDSFNW 360
Db 301 TRDIFTDPIPSLNTLOEQYGTFLSIENSIRKPHLFDYLOGIEFHTRLOPGYFGKDSFNW 360

QY 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAWPNKGKYL 420
 DB 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAWPNKGKYL 420
 QY 421 VTKVDFSYDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQNL 480
 DB 421 VTKVDFSYDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQNL 480
 QY 481 CFLMQDRRGITPFTTWTTHRSVDFFNTDAEKITQLPVKAYALSSGASIIIEGPGFTG 540
 DB 481 CFLMQDRRGITPFTTWTTHRSVDFFNTDAEKITQLPVKAYALSSGASIIIEGPGFTG 540
 QY 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 DB 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 QY 601 DDLTYQTFLATTNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
 DB 601 DDLTYQTFLATTNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
 RESULT 40
 AAY23196
 ID AAY23196 standard; protein; 652 AA.
 AC AAY23196;
 XX
 DT 24-AUG-1999 (first entry)
 XX
 DE Amino acid sequence of Cry3Bb.11046 polypeptide.
 DE
 KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
 KW coleoptera; southern corn rootworm; western corn root worm;
 KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
 KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
 XX
 OS Synthetic.
 OS Bacillus thuringiensis.
 OS
 XX WO9931248-A1.
 XX
 PD 24-JUN-1999.
 XX
 PF 17-DEC-1998; 98WO-US026852.
 XX
 PR 18-DEC-1997; 97US-00993170.
 PR 18-DEC-1997; 97US-00993722.
 PR 18-DEC-1997; 97US-00993775.
 PR 18-DEC-1997; 97US-00996441.
 XX
 PA (ECOG-) ECOGEN INC.
 PA (MONS) MONSANTO CO.
 XX
 PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
 PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
 XX
 DR WPI; 1999-395184/33.
 XX
 PT Insecticidal Bacillus thuringiensis proteins.
 XX
 PS Claim 39; Page 407-409; 512pp; English.
 XX
 CC AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
 CC Cry3Bb mutant proteins. The specification also describes methods of
 CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
 CC polypeptide was modified to have improved insecticidal activity or
 CC enhanced insecticidal specificity against a target insect. The
 CC modification comprises at least one amino acid substitution, addition, or
 CC deletion in the primary sequence of the native or unmodified Cry3Bb
 CC polypeptide, wherein the substitution or deletion occurs at a position
 CC corresponding to from amino acids 1-365 of the unmodified
 CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).

CC The polypeptide can be used to kill coleopteran pests, especially by
 CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
 CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
 CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance
 XX
 SQ Sequence 652 AA;
 Query Match 99.2%; Score 3379; DB 2; Length 652;
 Best Local Similarity 99.1%; Pred. No. 1.4e-274;
 Matches 646; Conservative 2; Mismatches 4; Indels 0; Gaps 0;
 QY 1 MNPNNRSEHDTTKVTNSLQTNHNOYPLADNPNSLLELNKYKEFLRMTESSSTEVL 60
 DB 1 MNPNNRSEHDTTKVTNSLQTNHNOYPLADNPNSLLELNKYKEFLRMTESSSTEVL 60
 QY 61 TVKDAVGTGIVGVGQILGVGVVPFAGALTSTFYQSFLNTIWPSPDADPWKAFMAQVEVL 120
 DB 61 TVKDAVGTGIVGVGQILGVGVVPFAGALTSTFYQSFLNTIWPSPDADPWKAFMAQVEVL 120
 QY 121 KIEEYAKSKALAELOGLQNNFEDYNALNSWKKTPLSLRSKRSQDRIREFLSOASHFRN 180
 DB 121 KIEEYAKSKALAELOGLQNNFEDYNALNSWKKTPLSLRNPHSQGRIRREFLSOASHFRN 180
 QY 181 SMPSPAVSKFEVLFLPTYAQAANTHLLKDAQVFGEEGWYSSDVAEFVHRQLKLTQY 240
 DB 181 SMPSPAVSKFEVLFLPTYAQAANTHLLKDAQVFGEEGWYSSDVAEFVHRQLKLTQY 240
 QY 241 TDHCNVNMYNGLNGLRGSTYDAWKFNRRREMTLTVDLVLFPFYDRLYSGVKTEL 300
 DB 241 TDHCNVNMYNGLNGLRGSTYDAWKFNRRREMTLTVDLVLFPFYDRLYSGVKTEL 300
 QY 301 TRDIFTDPIFSLNTLOEYGTPTFLSIENSRKPHLPDYLOGIEPHTLQPGYFKDSFNYW 360
 DB 301 TRDIFTDPIFSLNTLOEYGTPTFLSIENSRKPHLPDYLOGIEPHTLQPGYFKDSFNYW 360
 QY 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAWPNKGKYL 420
 DB 361 SGNVETRPISGSKTITSPFYGDKSTPEVQKLSFDGQKVYRTIANTDVAWPNKGKYL 420
 QY 421 VTKVDFSYDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQNL 480
 DB 421 VTKVDFSYDDQKNETSTQYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQNL 480
 QY 481 CFLMQDRRGITPFTTWTTHRSVDFFNTDAEKITQLPVKAYALSSGASIIIEGPGFTG 540
 DB 481 CFLMQDRRGITPFTTWTTHRSVDFFNTDAEKITQLPVKAYALSSGASIIIEGPGFTG 540
 QY 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 DB 541 LFLKESNSIAKFKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
 QY 601 DDLTYQTFLATTNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
 DB 601 DDLTYQTFLATTNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
 RESULT 41
 AAY23172
 ID AAY23172 standard; protein; 652 AA.
 AC AAY23172;
 XX
 DT 24-AUG-1999 (first entry)
 XX
 DE Amino acid sequence of Cry3Bb.11221 polypeptide.
 XX
 KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
 KW coleoptera; southern corn rootworm; western corn root worm;
 KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
 KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
 XX

OS Synthetic.
OS Bacillus thuringiensis.
XX WO9931248-A1.
PN
XX
XX
XX 24-JUN-1999.
XX
XX 17-DEC-1998; 98WO-US026852.
XX
XX 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX
XX Insecticidal Bacillus thuringiensis proteins.
PT
XX
XX Claim 39; Page 272-274; 512pp; English.
XX
XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;
Query Match 99.1%; Score 3377; DB 2; Length 652;
Best Local Similarity 99.4%; Pred. No. 28-274;
Matches 648; Conservative 0; Mismatches 4; Indels 0; Gaps 0;
QY 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTVLDNS 60
DB 1 MNPNNRSEHDTIKVTPNSELOTHNQYPLADNPSTLEELNYKEFLRMTEDSSTVLDNS 60
QY 61 TVKDAGVTGTSVVGQILGVGVFPFAGALTSPYQSFINTIWPSDADPWKAFMAQVEVLIDK 120
DB 61 TVKDAGVTGTSVVGQILGVGVFPFAGALTSPYQSFINTIWPSDADPWKAFMAQVEVLIDK 120
QY 121 KIEEYAKSKALAELOGLQNNFEDYNALNSWKTPLSLRKESQDRIRLELFSQAESHPRN 180
DB 121 KIEEYAKSKALAELOGLQNNFEDYNALNSWKTPLSLRKESQDRIRLELFSQAESHPRN 180
QY 181 SMPFSAVSKFEVLFPTTAAQANTHLLLLKDAQVFGGEWGSSEDDVAEFYHROLKLTQY 240
DB 181 SMPFSAVSKFEVLFPTTAAQANTHLLLLKDAQVFGGEWGSSEDDVAEFYHROLKLTQY 240
QY 241 TDHCNWNVNGLNGLRGSTDYDAWKFNPRRMTLTVLDLIVLFPFFDIRLYSGKVKTTEL 300
DB 241 TDHCNWNVNGLNGLRGSTDYDAWKFNPRRMTLTVLDLIVLFPFFDIRLYSGKVKTTEL 300
QY 301 TRDIFTDPFSLNTLQEVGPTFLSIENSIRKPHLFDYLGQIEFHTRLQPGVFGKDSFNW 360
DB 301 TRDIFTDPFSLNTLQEVGPTFLSIENSIRKPHLFDYLGQIEFHTRLQPGVFGKDSFNW 360

QY 361 SGNVYETRPSIGSSKTIITSPFYGDKSTBPVKLSFDGQKVYRTIANTDVAAMPNGKVYLG 420
DB 361 SGNVYETRPSIGSSKTIITSPFYGDKSTBPVKLSFDGQKVYRTIANTDVAAMPNGKVYLG 420
QY 421 VTKVDFSOYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTTDEPLEKAYSHOLNVAE 480
DB 421 VTKVDFSOYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPETTTDEPLEKAYSHOLNVAE 480
QY 481 CFLMODRRGTIPFFFTWTHRSVDFNTIDAETKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
DB 481 CFLMODRRGTIPFFFTWTHRSVDFNTIDAETKITQLPVVKAYALSSGASIIIEGPGFTGGNL 540
QY 541 LFLKSSNSIAKFKVTLNSAALLQRYRIRYASTNLRFLVQNSNDFLVIYINKTMNK 600
DB 541 LFLKSSNSIAKFKVTLNSAALLQRYRIRYASTNLRFLVQNSNDFLVIYINKTMNK 600
QY 601 DDDLTYYQTDFDLATNNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
DB 601 DDDLTYYQTDFDLATNNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
RESULT 42
AAY23208
ID AAY23208 standard; protein; 653 AA.
XX
AC AAY232208;
XX
DT 24-AUG-1999 (first entry)
XX
DE Amino acid sequence of plantized Cry3Bb.11231 polypeptide.
XX
KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera virgifera LeConte; insecticide resistance.
XX
OS Synthetic.
OS Bacillus thuringiensis.
PN WO9931248-A1.
XX
PD 24-JUN-1999.
XX
PF 17-DEC-1998; 98WO-US026852.
XX
PR 18-DEC-1997; 97US-00993170.
PR 18-DEC-1997; 97US-00993722.
PR 18-DEC-1997; 97US-00993775.
PR 18-DEC-1997; 97US-00996441.
XX (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
XX English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch MA, Romano C;
XX WPI; 1999-395184/33.
XX Insecticidal Bacillus thuringiensis proteins.
PT
XX
PS Claim 39; Page 484-486; 512pp; English.
XX
XX AAY23172-Y23206, and AAY23208-X23209 represent new Bacillus thuringiensis
CC Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera virgifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX
SQ Sequence 652 AA;

CC application to the environment. It is especially useful against southern
 CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
 CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
 CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
 CC plants with increased insecticide resistance

XX SQ Sequence 653 AA;

Query Match 99.1%; Score 3377; DB 2; Length 653;
 Best Local Similarity 99.4%; Pred. No. 2e-274;
 Matches 647; Conservative 1; Mismatches 3; Indels 0; Gaps 0;

QY 2 NPNRSEHDTIKVTPNSELTQNHQYPLADNPSTLEELNYKEFLRMTESSSTEVLNDST 61
 DB 3 NPNRSEHDTIKVTPNSELTQNHQYPLADNPSTLEELNYKEFLRMTESSSTEVLNDST 62

QY 62 VKDAVGTGISVVGQILGVGVPFAGALTSFYQSFLNTIMPSPADPWKAFMAQVEVLIDKK 121
 DB 63 VKDAVGTGISVVGQILGVGVPFAGALTSFYQSFLNTIMPSPADPWKAFMAQVEVLIDKK 122

QY 122 IEYAKSKALAEIQLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 181
 DB 123 IEYAKSKALAEIQLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 182

QY 182 MPSFAVSKFEVLPLPTVAQAANTHLLKDAQVGEWGYSSDVAEFYHRQLKLTQOYT 241
 DB 183 MPSFAVSKFEVLPLPTVAQAANTHLLKDAQVGEWGYSSDVAEFYHRQLKLTQOYT 242

QY 242 DHCNVNMYNGLRGSTYDAWKFNRFREMTLTVDLILVLPFFYDIRLYSGVKTELT 301
 DB 243 DHCNVNMYNGLRGSTYDAWKFNRFREMTLTVDLILVLPFFYDIRLYSGVKTELT 302

QY 302 RDIFTDPIFLNTLOEYGPFTLSIENSIRKPHLFDYLGIEFHTRLQPGYFGKDSFNYS 361
 DB 303 RDIFTDPIFLNTLOEYGPFTLSIENSIRKPHLFDYLGIEFHTRLQPGYFGKDSFNYS 362

QY 362 GNYVETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 421
 DB 363 GNYVETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 422

QY 422 TKVDFSQYDDQKNETSTQTYDSKRNGHVSQAQSIDQLPETTDEPLEKAYSHQLNYAEC 481
 DB 423 TKVDFSQYDDQKNETSTQTYDSKRNGHVSQAQSIDQLPETTDEPLEKAYSHQLNYAEC 482

QY 482 FLMDRRGTIPFTTWTTHRSVDFNTIDAETITOLPVVKAYALSSGASIIIEGPGFTGNLL 541
 DB 483 FLMDRRGTIPFTTWTTHRSVDFNTIDAETITOLPVVKAYALSSGASIIIEGPGFTGNLL 542

QY 542 FLKSSNSIAKFKVTLSAALLQRYRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601
 DB 543 FLKSSNSIAKFKVTLSAALLQRYRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602

QY 602 DDLTYQTFDLATNNSMGFGSKNELIIGAESFVSNEKIYIDKIEPIVOL 652
 DB 603 DDLTYQTFDLATNNSMGFGSKNELIIGAESFVSNEKIYIDKIEPIVOL 653

RESULT 43

AA70444
 ID AA70444 standard; protein; 653 AA.

XX
 AC AA70444;

XX
 DT 21-JUN-2000 (first entry)

DE Bacillus thuringiensis delta-endotoxin Cry3Bb variant v11231.
 XX
 KW delta-endotoxin; Cry3B; Bt toxin; crystal protein; insect pest;
 KW insecticide; Coleopteran; expression cassette; transgenic plant;
 KW Cry3Bb variant v11231.
 XX
 OS Bacillus thuringiensis.
 OS Synthetic.

XX PN WO200011185-A2.
 PD 02-MAR-2000.
 XX PF 19-AUG-1999; 99WO-US018883.
 XX PR 19-AUG-1998; 98US-0097150P.
 XX PA (MONS) MONSANTO CO.
 XX PI Romano CP;
 DR WPI; 2000-246568/21.
 DR N-PSDB; AA251638, AA251641, AA251642, AA251655, AA251656.
 XX
 PT Novel expression cassettes which express Bacillus thuringiensis Cry3
 PT delta-endotoxin portion which is toxic to coleopteran insect pests,
 PT useful for producing transgenic plants with improved insecticidal
 PT activity.
 XX
 PS Claim 6; Page 106-108; 171pp; English.
 XX
 CC The present sequence is a Bacillus thuringiensis delta-endotoxin Cry3Bb
 CC variant AA11231 which is toxic to Coleopteran insect pests. The coding
 CC sequence of this protein is used in an expression cassette that provides
 CC improved expression of Cry3B or Cry3B variant proteins in transgenic
 CC plants e.g. maize. Transgenic plants expressing higher levels of Cry3B
 CC proteins exhibit increased insecticidal activity against Coleopteran
 CC pests
 XX SQ Sequence 653 AA;

Query Match 99.1%; Score 3377; DB 3; Length 653;
 Best Local Similarity 99.4%; Pred. No. 2e-274;
 Matches 647; Conservative 1; Mismatches 3; Indels 0; Gaps 0;

QY 2 NPNRSEHDTIKVTPNSELTQNHQYPLADNPSTLEELNYKEFLRMTESSSTEVLNDST 61
 DB 3 NPNRSEHDTIKVTPNSELTQNHQYPLADNPSTLEELNYKEFLRMTESSSTEVLNDST 62

QY 62 VKDAVGTGISVVGQILGVGVPFAGALTSFYQSFLNTIMPSPADPWKAFMAQVEVLIDKK 121
 DB 63 VKDAVGTGISVVGQILGVGVPFAGALTSFYQSFLNTIMPSPADPWKAFMAQVEVLIDKK 122

QY 122 IEYAKSKALAEIQLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 181
 DB 123 IEYAKSKALAEIQLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHFRNS 182

QY 182 MPSFAVSKFEVLPLPTVAQAANTHLLKDAQVGEWGYSSDVAEFYHRQLKLTQOYT 241
 DB 183 MPSFAVSKFEVLPLPTVAQAANTHLLKDAQVGEWGYSSDVAEFYHRQLKLTQOYT 242

QY 242 DHCNVNMYNGLRGSTYDAWKFNRFREMTLTVDLILVLPFFYDIRLYSGVKTELT 301
 DB 243 DHCNVNMYNGLRGSTYDAWKFNRFREMTLTVDLILVLPFFYDIRLYSGVKTELT 302

QY 302 RDIFTDPIFLNTLOEYGPFTLSIENSIRKPHLFDYLGIEFHTRLQPGYFGKDSFNYS 361
 DB 303 RDIFTDPIFLNTLOEYGPFTLSIENSIRKPHLFDYLGIEFHTRLQPGYFGKDSFNYS 362

QY 362 GNYVETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 421
 DB 363 GNYVETRPSIGSSKTIITSPFYGDKSTEPVQKLSFDGQKVYRTIANTDVAAPNGKVYLG 422

QY 422 TKVDFSQYDDQKNETSTQTYDSKRNGHVSQAQSIDQLPETTDEPLEKAYSHQLNYAEC 481
 DB 423 TKVDFSQYDDQKNETSTQTYDSKRNGHVSQAQSIDQLPETTDEPLEKAYSHQLNYAEC 482

QY 482 FLMDRRGTIPFTTWTTHRSVDFNTIDAETITOLPVVKAYALSSGASIIIEGPGFTGNLL 541
 DB 483 FLMDRRGTIPFTTWTTHRSVDFNTIDAETITOLPVVKAYALSSGASIIIEGPGFTGNLL 542

QY 542 FLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRFLVQNSNDDFLVIYINKTMKD 601
DB 543 FLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRFLVQNSNDDFLVIYINKTMKD 602
QY 602 DDLTYQTFLATTNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
DB 603 DDLTYQTFLATTNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 653

RESULT 44
ABU09195
ID ABU09195 standard; protein; 653 AA.
AC ABU09195;
XX
XX
DT 12-JUN-2003 (first entry)
XX
DE Bacillus thuringiensis delta endotoxin Cry3Bbv11231.
XX
XX Cry3Bbv11231; delta-endotoxin; plant; transgenic; insecticide; crystal 3;
KW Cry3; Coleopteran insect infestation; increased toxicity;
KW season long protection; beetle.
XX
OS Bacillus thuringiensis.
OS Synthetic.
XX
PN US6501009-B1.
XX
XX 31-DEC-2002.
XX 19-AUG-1999; 99US-00377466.
XX 19-AUG-1999; 99US-00377466.
XX
XX (MONS) MONSANTO TECHNOLOGY LLC.
XX
XX Romano CP;
XX
XX WPI; 2003-352192/33.
DR N-P8DB; ABX95182.
XX
XX New modified polynucleotide useful for controlling Coleopteran insect
PT infestation in a field of crop plants encodes insecticidal crystal 3
PT Bacillus thuringiensis delta-endotoxin.
XX
XX Example 2; Col 73-78; 107pp; English.
XX
XX The invention relates to a modified polynucleotide which encodes an
CC insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
CC as CryBb. The modified polynucleotide is useful for producing a
CC transformed cell, by introducing the modified polynucleotide into a cell
CC such as a plant cell (preferably a maize cell) or a microbial cell. The
CC modified polynucleotide is useful for producing a transformed maize plant
CC by introducing the modified polynucleotide into a maize plant cell,
CC selecting a transformed maize plant cell and regenerating a maize plant
CC from the transformed maize plant cell. A transgenic plant expressing the
CC modified polynucleotide is useful for controlling Coleopteran insect
CC infestation in a field of crop plants. The modified polynucleotide is
CC useful for producing transgenic plants expressing higher levels of the
CC insect controlling B. thuringiensis delta-endotoxin. The modified
CC polynucleotide provides up to 10 fold higher levels of insect controlling
CC delta-endotoxin relative to the highest levels obtained using prior
CC compositions. In particular, transgenic maize expressing higher levels of
CC the Cry3Bb protein designed to exhibit increased toxicity toward
CC Coleopteran pests deliver superior levels of insect protection and are
CC less likely to sponsor development of populations of target insects that
CC are resistant to the insecticidally active protein. Improved control of
CC susceptible target insect pests and season long protection from insect
CC pathogens is achieved using the modified polynucleotide. The modified
CC polynucleotide reduces the number of transgenic events that have to be
CC screened in order to identify one which contains beneficial levels of one
CC or more insect controlling compositions. The present sequence represents
CC the amino acid sequence of Bacillus thuringiensis delta endotoxin

CC Cry3Bbv11231
XX
SQ Sequence 653 AA;
Query Match 99.1%; Score 3377; DB 6; Length 653;
Best Local Similarity 99.4%; Pred. No. 2e-274;
Matches 647; Conservative 1; Mismatches 3; Indels 0; Gaps 0;
QY 2 NPNRSEHDTIKVTPNSELOTHNHQYPLADNPSTLEELNYKEFLRMTEDSTEVLDNST 61
DB 3 NPNRSEHDTIKVTPNSELOTHNHQYPLADNPSTLEELNYKEFLRMTEDSTEVLDNST 62
QY 62 VKDAVGTGIVVGQILGVGVPPFAGALTSTFQSFNTIWPDSADPWKAFMAQVEVLIDKK 121
DB 63 VKDAVGTGIVVGQILGVGVPPFAGALTSTFQSFNTIWPDSADPWKAFMAQVEVLIDKK 122
QY 122 IEEYAKSKALAELOQLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQASHFRNS 181
DB 123 IEEYAKSKALAELOQLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRLFSQASHFRNS 182
QY 182 MPFAVSKFEVLFLPTAQAANTHLLLLKDAQVGEWGYSSYEDVAEYHRLKLTQQYT 241
DB 183 MPFAVSKFEVLFLPTAQAANTHLLLLKDAQVGEWGYSSYEDVAEYHRLKLTQQYT 242
QY 242 DHCYNNVNVGLNGRSTYDAWKFNRFRREMTLTVDLIVLFPFYDIRLYSKGVKTELT 301
DB 243 DHCYNNVNVGLNGRSTYDAWKFNRFRREMTLTVDLIVLFPFYDIRLYSKGVKTELT 302
QY 302 RDIPTDPIFLLTTLQKYGPTFLSLIENSIRKPHLFDYLGQIBFHTRLQPGYFGKDSFNYS 361
DB 303 RDIPTDPIFLLTTLQKYGPTFLSLIENSIRKPHLFDYLGQIBFHTRLQPGYFGKDSFNYS 362
QY 362 GNYVETRPSIGSSKTIITSPFYGDKSTEPVKLSPDGQKVYRTIANTDVAAMPNGKVILGV 421
DB 363 GNYVETRPSIGSSKTIITSPFYGDKSTEPVKLSPDGQKVYRTIANTDVAAMPNGKVILGV 422
QY 422 TKVDFSOYDDQKNETSTQTYDSKRNNGHVSAQSDIDQLPETTTDPLEKAYSHQLNYAEC 481
DB 423 TKVDFSOYDDQKNETSTQTYDSKRNNGHVSAQSDIDQLPETTTDPLEKAYSHQLNYAEC 482
QY 482 FLMQDRRTGTPFFTWTHRSVDFNTIDAETITQLPVVYKAYALSSGASIIEGPGFTGGNLL 541
DB 483 FLMQDRRTGTPFFTWTHRSVDFNTIDAETITQLPVVYKAYALSSGASIIEGPGFTGGNLL 542
QY 542 FLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRFLVQNSNDDFLVIYINKTMKD 601
DB 543 FLKSSNSIAKFKVTLNSAALLQRYVRIRYASTTNLRFLVQNSNDDFLVIYINKTMKD 602
QY 602 DDLTYQTFLATTNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 652
DB 603 DDLTYQTFLATTNSNMGFSGDKNELIIGAESFVSNKEIYIDKIEFIPVQL 653
RESULT 45
ABU09198
ID ABU09198 standard; protein; 653 AA.
XX
XX ABU09198;
AC
XX
DT 12-JUN-2003 (first entry)
XX
DE Bacillus thuringiensis delta endotoxin Cry3Bbv11231.
KW Cry3Bbv11231; delta-endotoxin; plant; transgenic; insecticide;
KW crystal 3; Cry3; Coleopteran insect infestation; increased toxicity;
KW season long protection; beetle.
XX
OS Bacillus thuringiensis.
OS Synthetic.
XX
PN US6501009-B1.
XX
PD 31-DEC-2002.

XX PF 19-AUG-1999; 99US-00377466.
XX PR 19-AUG-1999; 99US-00377466.
XX PA (MONS) MONSANTO TECHNOLOGY LLC.
XX PI Romano CP;
XX DR WPI; 2003-352192/33.
XX DR N-PSDB; ABX95185, ABX95186, ABX95199, ABX95200.
XX PT New modified polynucleotide useful for controlling Coleopteran insect
PT infestation in a field of crop plants encodes insecticidal crystal 3
PT Bacillus thuringiensis delta-endotoxin.
XX PS Disclosure; Col 101-104; 107pp; English.
XX CC The invention relates to a modified polynucleotide which encodes an
CC insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
CC as Cry3Bb. The modified polynucleotide is useful for producing a
CC transformed cell, by introducing the modified polynucleotide into a cell
CC such as a plant cell (preferably a maize cell) or a microbial cell. The
CC modified polynucleotide is useful for producing a transformed maize plant
CC by introducing the modified polynucleotide into a maize plant cell,
CC selecting a transformed maize plant cell and regenerating a maize plant
CC from the transformed maize plant cell. A transgenic plant expressing the
CC modified polynucleotide is useful for controlling Coleopteran insect
CC infestation in a field of crop plants. The modified polynucleotide is
CC useful for producing transgenic plants expressing higher levels of the
CC insect controlling B. thuringiensis delta-endotoxin. The modified
CC polynucleotide provides up to 10 fold higher levels of insect controlling
CC delta-endotoxin relative to the highest levels obtained using prior
CC compositions. In particular, transgenic maize expressing higher levels of
CC the Cry3Bb protein designed to exhibit increased toxicity toward
CC Coleopteran pests deliver superior levels of insect protection and are
CC less likely to sponsor development of populations of target insects that
CC are resistant to the insecticidally active protein. Improved control of
CC susceptible target insect pests and season long protection from insect
CC pathogens is achieved using the modified polynucleotide. The modified
CC polynucleotide reduces the number of transgenic events that have to be
CC screened in order to identify one which contains beneficial levels of one
CC or more insect controlling compositions. The present sequence represents
CC the amino acid sequence of Bacillus thuringiensis delta endotoxin
CC Cry3Bb1v1231
XX CC
XX SQ Sequence 653 AA;

Query Match 99.1%; Score 3377; DB 6; Length 653;
Best Local Similarity 99.4%; Pred. No. 2e-274;
Matches 647; Conservative 1; Mismatches 3; Indels 0; Gaps 0;

QY 2 NPNRSEHDTIKVTPNSELTQNNQVPLADNPNTLEELNYKEFLRMTEDSSTEVLNDST 61
DB 3 NPNRSEHDTIKVTPNSELTQNNQVPLADNPNTLEELNYKEFLRMTEDSSTEVLNDST 62
QY 62 VKDAVGTGTSVGVQILGVGVPPAGALTSYQSQFLNTIWPSPADPKAFMAQVEVLIDKK 121
DB 63 VKDAVGTGTSVGVQILGVGVPPAGALTSYQSQFLNTIWPSPADPKAFMAQVEVLIDKK 122
QY 122 IEYAKSKALAEQLQNNFEDVYNALNSWKKTPLSLRKSRQDRIRFLFSQAESHFRNS 181
DB 123 IEYAKSKALAEQLQNNFEDVYNALNSWKKTPLSLRKSRQDRIRFLFSQAESHFRNS 182
QY 182 MPFSAVSKFEVLPTPYAQANHTLLLDKDAQVFGSEWYSSDDVAEPFTHRQKLTKQYTT 241
DB 183 MPFSAVSKFEVLPTPYAQANHTLLLDKDAQVFGSEWYSSDDVAEPFTHRQKLTKQYTT 242
QY 242 DHCNVNMYNGLGRSTYDAWKFNFRREMTLTVLDLVLPPFYDRLYKSGVKTELT 301
DB 243 DHCNVNMYNGLGRSTYDAWKFNFRREMTLTVLDLVLPPFYDRLYKSGVKTELT 302
QY 302 RDIFTDPIFLNTLQBYGPTFLSIENSIRKPHLFDYLGQTEFHTRLPQPGYFGKDSFNYS 361

DB 303 RDIFTDPIELLATLQKYGPTFLSIENSIRKPHLFDYLGQTEFHTRLPQPGYFGKDSFNYS 362
QY 362 GNYVETRPSIGSKTITSPFYGDKSTPEPVOKLSFDGQKYVRTIANTDVAAPNGKYVLGV 421
DB 363 GNYVETRPSIGSKTITSPFYGDKSTPEPVOKLSFDGQKYVRTIANTDVAAPNGKYVLGV 422
QY 422 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQLNYAEC 481
DB 423 TKVDFSQYDDQKNETSTQTYDSKRNNGHVSAQDSIDQLPPTTDEPLEKAYSHQLNYAEC 482
QY 482 FLMDRRGTIPFTTWRHSVDFNTIDAKITQLPVKAYALSSGASIIIEGPGFTGNLL 541
DB 483 FLMDRRGTIPFTTWRHSVDFNTIDAKITQLPVKAYALSSGASIIIEGPGFTGNLL 542
QY 542 FLKESNSITAKPKVTLSAALLQRYVRIRYASTTNLRLFVQNSNDELVIYINKTMNKD 601
DB 543 FLKESNSITAKPKVTLSAALLQRYVRIRYASTTNLRLFVQNSNDELVIYINKTMNKD 602
QY 602 DDLTYQTFDLATTNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652
DB 603 DDLTYQTFDLATTNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 653

RESULT 46
ABW01053
ID ABW01053 standard; protein; 653 AA.
XX AC ABW01053;
XX DT 15-JAN-2004 (first entry)
XX DE Bacillus thuringiensis Cry3Bb-delta-endotoxin variant v11231 protein.
XX KW Transgenic plant; Cry3Bb-delta-endotoxin; Coleopteran pest resistance;
XX KW insecticide; variant.
XX OS Bacillus thuringiensis.
XX OS Synthetic.
XX PN US2003115630-A1.
XX PD 19-JUN-2003.
XX PF 29-AUG-2002; 2002US-00232665.
XX PR 19-AUG-1999; 99US-00377466.
XX PA (ROMA/) ROMANO C P.
XX PI Romano CP;
XX XX WPI; 2003-810928/76.
DR N-PSDB; AAD61786, AAD61789, AAD61790, AAD61803, AAD61804.
XX PT New transgenic plant resistant to Coleopteran pests, comprises Bacillus
XX thuringiensis Cry3-delta-endotoxin gene.
XX PS Claim 6; Page 40-42; Opp; English.
XX CC The invention relates to novel transgenic plants comprising Bacillus
CC thuringiensis Cry3-delta-endotoxin gene or its variants having
CC coleopteran inhibitory activity. The invention is useful for controlling
CC Coleopteran insect infestation in a field of crop plants. The present
CC sequence is B. thuringiensis Cry3Bb-delta-endotoxin variant protein
XX SQ Sequence 653 AA;

Query Match 99.1%; Score 3377; DB 7; Length 653;
Best Local Similarity 99.4%; Pred. No. 2e-274;
Matches 647; Conservative 1; Mismatches 3; Indels 0; Gaps 0;

QY 2 NPNRSEHDTIKVTPNSELTQNNQVPLADNPNTLEELNYKEFLRMTEDSSTEVLNDST 61

Db 3 NPNRSEHDTIKVTPNSELQTNHNPYPLADNPSTLEELNYKEFLRMTEDSSTEVLNDST 62
QY 62 VKDAVGTGIVGVQILGVGVPPAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDKK 121
Db 63 VKDAVGTGIVGVQILGVGVPPAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDKK 122
QY 122 IEYAKSKALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFNS 181
Db 123 IEYAKSKALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFNS 182
QY 182 MFSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSSEDAEFYHRQLKLTQQYT 241
Db 183 MFSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSSEDAEFYHRQLKLTQQYT 242
QY 242 DHCNVWYVGLNGLRGSTYDAWVKFNRPFRMTLTVLDLIVLPPYDRLYKSGVKTELT 301
Db 243 DHCNVWYVGLNGLRGSTYDAWVKFNRPFRMTLTVLDLIVLPPYDRLYKSGVKTELT 302
QY 302 RDIPTDPIFSLNTLOEYGPTELSIENSIRKPHLFDYLGIEFHTRLOPGYFGKDSFNYS 361
Db 303 RDIPTDPIFSLNTLOEYGPTELSIENSIRKPHLFDYLGIEFHTRLOPGYFGKDSFNYS 362
QY 362 GNYVETRPSIGSSKTIITSPFYGDKSTPEPVQKLSFDGQKYRTIANTDVAAPNGKVILGV 421
Db 363 GNYVETRPSIGSSKTIITSPFYGDKSTPEPVQKLSFDGQKYRTIANTDVAAPNGKVILGV 422
QY 422 TKVDPSQYDDQKNETSTQTYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHQLNYAEC 481
Db 423 TKVDPSQYDDQKNETSTQTYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHQLNYAEC 482
QY 482 FLNQDRRGTIIPFTTWTHTSRVDFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGGNLL 541
Db 483 FLNQDRRGTIIPFTTWTHTSRVDFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGGNLL 542
QY 542 FLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601
Db 543 FLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602
QY 602 DDLTYQTDFLATNTNMGSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 652
Db 603 DDLTYQTDFLATNTNMGSGDKNELIIGAESFVSNKEIYIDKIEFIPVOL 653

RESULT 47

AAY23209
ID AAY23209 standard; protein; 652 AA.

XX AC AAY23209;
XX DT 24-AUG-1999 (first entry)
XX DE Amino acid sequence of Cry3Bb.11098 polypeptide.
XX KW Cry3Bb; mutant; insecticidal activity; insecticidal specificity;
KW coleoptera; southern corn rootworm; western corn root worm;
KW Diabrotica undecimpunctata howardi Barber; transgenic plant;
KW Diabrotica virgifera vergifera LeConte; insecticide resistance.
XX OS Synthetic.
OS Bacillus thuringiensis.
XX PN W099311248-A1.
XX PD 24-JUN-1999.
XX PF 17-DEC-1998; 98WO-US026852.
XX PR 18-DEC-1997; 97US-00993170.
XX PR 18-DEC-1997; 97US-00993722.
XX PR 18-DEC-1997; 97US-00993775.
XX PR 18-DEC-1997; 97US-00996441.

PA (ECOG-) ECOGEN INC.
PA (MONS) MONSANTO CO.
PI English L, Brussock SM, Malvar TM, Bryson JW, Kulesza CA;
PI Walters FS, Slatin SL, Von Tersch NA, Romano C;
XX WPI; 1999-395184/33.
XX Insecticidal Bacillus thuringiensis proteins.
PT Claim 39; Page 492-494; 512pp; English.
PS AAY23172-X23206, and AAY23208-X23209 represent new Bacillus thuringiensis
XX Cry3Bb mutant proteins. The specification also describes methods of
CC altering Bacillus thuringiensis Cry3Bb. The B. thuringiensis Cry3Bb
CC polypeptide was modified to have improved insecticidal activity or
CC enhanced insecticidal specificity against a target insect. The
CC modification comprises at least one amino acid substitution, addition, or
CC deletion in the primary sequence of the native or unmodified Cry3Bb
CC polypeptide, wherein the substitution or deletion occurs at a position
CC corresponding to from about amino acids 1-365 of the unmodified
CC polypeptide sequence (AAY23207 represents the wild type Cry3Bb protein).
CC The polypeptide can be used to kill coleopteran pests, especially by
CC application to the environment. It is especially useful against southern
CC corn rootworm and western corn root worm, (Diabrotica undecimpunctata
CC howardi Barber, and Diabrotica virgifera vergifera LeConte respectively).
CC The mutant cry3Bb polynucleotides can also be used to produce transgenic
CC plants with increased insecticide resistance
XX SQ Sequence 652 AA;

Query Match 99.1%; Score 3375; DB 2; Length 652;
Best Local Similarity 99.2%; Pred. No. 3e-274;
Matches 647; Conservative 1; Mismatches 4; Indels 0; Gaps 0;

QY 1 MNPNNRSEHDTIKVTPNSELQTNHNPYPLADNPSTLEELNYKEFLRMTEDSSTEVLNDS 60
Db 1 MNPNNRSEHDTIKVTPNSELQTNHNPYPLADNPSTLEELNYKEFLRMTEDSSTEVLNDS 60
QY 61 TVKDAVGTGIVGVQILGVGVPPAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDK 120
Db 61 TVKDAVGTGIVGVQILGVGVPPAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDK 120
QY 121 KIEYAKSKALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFNS 180
Db 121 KIEYAKSKALAELOGLQNNFEDYVVALNSWKKTPLSLRSKRSQDRIRLELFSQAESHFNS 180
QY 181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSSEDAEFYHRQLKLTQQY 240
Db 181 SMPSFAVSKFEVLFLPTYAQAANTHLLLLKDAQVFGEEWGYSSSEDAEFYHRQLKLTQQY 240
QY 241 TDHCNVWYVGLNGLRGSTYDAWVKFNRPFRMTLTVLDLIVLPPYDRLYKSGVKTELT 300
Db 241 TDHCNVWYVGLNGLRGSTYDAWVKFNRPFRMTLTVLDLIVLPPYDRLYKSGVKTELT 300
QY 301 TRDIFTDPIFSLNTLOEYGPTELSIENSIRKPHLFDYLGIEFHTRLOPGYFGKDSFNYS 360
Db 301 TRDIFTDPIFSLNTLOEYGPTELSIENSIRKPHLFDYLGIEFHTRLOPGYFGKDSFNYS 360
QY 361 SGNYVETRPSIGSSKTIITSPFYGDKSTPEPVQKLSFDGQKYRTIANTDVAAPNGKVILG 420
Db 361 SGNYVETRPSIGSSKTIITSPFYGDKSTPEPVQKLSFDGQKYRTIANTDVAAPNGKVILG 420
QY 421 VTKVDFSQYDDQKNETSTQTYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHQLNYAEC 480
Db 421 VTKVDFSQYDDQKNETSTQTYDSKRNGHVSAQDSIDQLPPTTDEPLEKAYSHQLNYAEC 480
QY 481 CFLMQDRRGTIIPFTTWTHTSRVDFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGGNLL 540
Db 481 CFLMQDRRGTIIPFTTWTHTSRVDFNTIDAEKITQLPVKAYALSSGASIIIEGPGFTGGNLL 540
QY 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600
Db 541 LFLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNNDFLVIYINKTMNK 600

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Db 541 LFLKSSNSIAKPKVTLNSAALLQRYVRIRYASTTTLNRLRFVQNSNNDFLVIYINKTMNK 600
Qy 601 DDDLTYOTFDLATTNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEPIPVOL 652
Db 601 DDDLTYOTFDLATTNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEPIPVOL 652

RESULT 48
ID AAY70446
XX AAY70446 standard; protein; 653 AA.
AC AAY70446;
XX
DT 21-JUN-2000 (first entry)
XX
DE Bacillus thuringiensis delta-endotoxin Cry3Bb variant 11231mv2.
XX
KW delta-endotoxin; Cry3B; Bt toxin; crystal protein; insect pest;
KW insecticide; Coleopteran; expression cassette; transgenic plant;
KW Cry3Bb variant 11231mv2.
XX
OS Bacillus thuringiensis.
OS Synthetic.
XX
PN WO200011185-A2.
XX
PD 02-MAR-2000.
XX
PF 19-AUG-1999; 99WO-US018883.
XX
PR 19-AUG-1998; 98US-0097150P.
XX
PA (MONS ) MONSANTO CO.
XX
PI Romano CP;
XX
DR WPI; 2000-246568/21.
DR N-PSDB; AA251640, AA251645, AA251646.
XX
PT Novel expression cassettes which express Bacillus thuringiensis Cry3
PT delta-endotoxin portion which is toxic to coleopteran insect pests,
PT useful for producing transgenic plants with improved insecticidal
PT activity.
XX
PS Claim 6; Page 116-118; 171pp; English.
XX
CC The present sequence is a Bacillus thuringiensis delta-endotoxin Cry3Bb
CC variant 11231mv2 which is toxic to Coleopteran insect pests. The coding
CC sequence of this protein is used in an expression cassette that provides
CC improved expression of Cry3B or Cry3B variant proteins in transgenic
CC plants e.g. maize. Transgenic plants expressing higher levels of Cry3B
CC proteins exhibit increased insecticidal activity against Coleopteran
CC pests
XX
SQ Sequence 653 AA;

Query Match 99.0%; Score 3373; DB 3; Length 653;
Best Local Similarity 99.2%; Pred. No. 4.4e-274;
Matches 646; Conservative 2; Mismatches 3; Indels 0; Gaps 0;

Qy 2 NPNRSEHDTIKVTPNSELOTNHNQYPLADNPNTLEELNKEFLRMTEDSSTEVLNST 61
Db 3 NPNRSEHDTIKVTPNSELOTNHNQYPLADNPNTLEELNKEFLRMTEDSSTEVLNST 62
Qy 62 VKDAVGTGISVGGIILGVGVPFAGALTSPYQSFLLNTIWPSPADPWKAFVAQVEVLIDKK 121
Db 63 VKDAVGTGISVGGIILGVGVPFAGALTSPYQSFLLNTIWPSPADPWKAFVAQVEVLIDKK 122
Qy 122 IEEYAKSKALAEQLQGNLFEDYVNALNSWKKTPLSLRSKRSQDRRELPSQASHFRNS 191
Db 123 IEEYAKSKALAEQLQGNLFEDYVNALNSWKKTPLSLRSKRSQDRRELPSQASHFRNS 192
Qy 182 MPFAVSKFEVLFLPTVAQAANTHLLLLKDAQVFGBEGWYSSSDVAEFYRQLKLTOQYT 241

183 MPFAVSKFEVLFLPTVAQAANTHLLLLKDAQVFGBEGWYSSSDVAEFYRQLKLTOQYT 242
242 DHCVMNNYGLNGLRGSTYDAWVKFNRFRREMTLTVDLILVLPFPFYDIRLYSKGVKTELT 301
243 DHCVMNNYGLNGLRGSTYDAWVKFNRFRREMTLTVDLILVLPFPFYDIRLYSKGVKTELT 302
302 RDIFTDPIFSLNTLOEYGPFTFLSIENSIRKPHLFDYLOQIEFHTRLQPGYFGKDSFNWYS 361
303 RDIFTDPIFLLTLOKYGPTFLSIENSIRKPHLFDYLOQIEFHTRLRPGYFGKDSFNWYS 362
362 GNYVETRPISGSKTITSPFYGDKSTEPVQKLSFDGQKVYRTTANTDVAAPNGKVYLG 421
363 GNYVETRPISGSKTITSPFYGDKSTEPVQKLSFDGQKVYRTTANTDVAAPNGKVYLG 422
422 TKVDFSOYDDQKNETSTQYVDSKRNNGHVSADSIDOLPETTDEPLEKAYSHOLNVAEC 481
423 TKVDFSOYDDQKNETSTQYVDSKRNNGHVSADSIDOLPETTDEPLEKAYSHOLNVAEC 482
482 FLMDRRGTIPFPTWTHRSVDFNTIDAETITOLPVVKAYALSSGASIIEGPGFTGNLL 541
483 FLMDRRGTIPFPTWTHRSVDFNTIDAETITOLPVVKAYALSSGASIIEGPGFTGNLL 542
542 FLKSSNSIAKPKVTLNSAALLQRYVRIRYASTTTLNRLRFVQNSNNDFLVIYINKTMNKD 601
543 FLKSSNSIAKPKVTLNSAALLQRYVRIRYASTTTLNRLRFVQNSNNDFLVIYINKTMNKD 602
602 DDLTYOTFDLATTNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEPIPVOL 652
603 DDLTYOTFDLATTNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEPIPVOL 653

RESULT 49
ABU09197
ID ABU09197 standard; protein; 653 AA.
XX
AC ABU09197;
XX
DT 12-JUN-2003 (first entry)
XX
DE Bacillus thuringiensis delta endotoxin Cry3Bb 11231mv2.
XX
KW Cry3Bb 11231mv2; delta-endotoxin; plant; transgenic; insecticide;
KW crystal 3; Cry3; Coleopteran insect infestation; increased toxicity;
KW season long protection; beetle.
XX
OS Bacillus thuringiensis.
OS Synthetic.
XX
PN US6501009-B1.
XX
PD 31-DEC-2002.
XX
PF 19-AUG-1999; 99US-00377466.
XX
PR 19-AUG-1999; 99US-00377466.
XX
PA (MONS ) MONSANTO TECHNOLOGY LLC.
XX
PI Romano CP;
XX
DR WPI; 2003-352192/33.
XX
PT New modified polynucleotide useful for controlling Coleopteran insect
PT infestation in a field of crop plants encodes insecticidal crystal 3
PT Bacillus thuringiensis delta-endotoxin.
XX
PS Disclosure; Fig 6; 107pp; English.
XX
CC The invention relates to a modified polynucleotide which encodes an
CC insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such
CC as CryBb. The modified polynucleotide is useful for producing a
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transformed cell, by introducing the modified polynucleotide into a cell such as a plant cell (preferably a maize cell) or a microbial cell. The modified polynucleotide is useful for producing a transformed maize plant by introducing the modified polynucleotide into a maize plant cell, selecting a transformed maize plant cell and regenerating a maize plant from the transformed maize plant cell. A transgenic plant expressing the modified polynucleotide is useful for controlling Coleopteran insect infestation in a field of crop plants. The modified polynucleotide is useful for producing transgenic plants expressing higher levels of the insect controlling B. thuringiensis delta-endotoxin. The modified polynucleotide provides up to 10 fold higher levels of insect controlling delta-endotoxin relative to the highest levels obtained using prior compositions. In particular, transgenic maize expressing higher levels of the Cry3Bb protein designed to exhibit increased toxicity toward Coleopteran pests deliver superior levels of insect protection and are less likely to sponsor development of populations of target insects that are resistant to the insecticidally active protein. Improved control of susceptible target insect pests and season long protection from insect pathogens is achieved using the modified polynucleotide. The modified polynucleotide reduces the number of transgenic events that have to be screened in order to identify one which contains beneficial levels of one or more insect controlling compositions. The present sequence represents the amino acid sequence of Bacillus thuringiensis delta endotoxin Cry3Bb 11231mv2

Query Match 99.0%; Score 3373; DB 6; Length 653;
Best Local Similarity 99.2%; Pred. No. 4.4e-274;
Matches 646; Conservative 2; Mismatches 3; Indels 0; Gaps 0;

QY 2 NPNRSEHDTIKVTNSELQTNHNOYPLADNPSTLEELNYKEFLRMWTDSTSEVLNDST 61
DB 3 NPNRSEHDTIKVTNSELQTNHNOYPLADNPSTLEELNYKEFLRMWTDSTSEVLNDST 62
QY 62 VKDAVGTGISVVGQILGVGVFPFAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDKK 121
DB 63 VKDAVGTGISVVGQILGVGVFPFAGALTSFYQSFLNTIWPSPADPWKAFMAQVEVLIDKK 122
QY 122 IEYAKSKALAELOGLONNFEDYVNALNSWKKTPLSLRSKRQDRIRELFSQAEHFNRNS 181
DB 123 IEYAKSKALAELOGLONNFEDYVNALNSWKKTPLSLRSKRQDRIRELFSQAEHFNRNS 182
QY 182 MFSFAVSKPEVLFLPTYAQAANTHLLKDAQVGEWGYSSDAEVAEFYRRLKLTQQYT 241
DB 183 MFSFAVSKPEVLFLPTYAQAANTHLLKDAQVGEWGYSSDAEVAEFYRRLKLTQQYT 242
QY 242 DHCVMNWNVLNGLRGSTYDAWVKFNRRPREMTLVLDLVLFPFYDIRLYSKGVKTELT 301
DB 243 DHCVMNWNVLNGLRGSTYDAWVKFNRRPREMTLVLDLVLFPFYDIRLYSKGVKTELT 302
QY 302 RDIPTDPIPSLNTLOEYGTFTLSIENSIRKPHLFYDLQIEFHTRLQPGYFGKDSFNYS 361
DB 303 RDIPTDPIPLATLQKYGTFTLSIENSIRKPHLFYDLQIEFHTRLQPGYFGKDSFNYS 362
QY 362 GNYVETRPSIGSKTITSFYGDKSTPEVQKLSFGQKVYRTIANTDVAAPNGKVYLG 421
DB 363 GNYVETRPSIGSKTITSFYGDKSTPEVQKLSFGQKVYRTIANTDVAAPNGKVYLG 422
QY 422 TKVDFSQYDDQKNETSTQTYDSKRNGHVSQAQSDIDQLPETTDBPLEKAYSHQLNYAEC 481
DB 423 TKVDFSQYDDQKNETSTQTYDSKRNGHVSQAQSDIDQLPETTDBPLEKAYSHQLNYAEC 482
QY 482 FLMQDRGTIPFTWTHRSVDFNTIDAETITQLPVKAYALSSGASIEEGPFTGGNLL 541
DB 483 FLMQDRGTIPFTWTHRSVDFNTIDAETITQLPVKAYALSSGASIEEGPFTGGNLL 542
QY 542 FLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNDFLVIYINKTMKD 601
DB 543 FLKESNSIAKPKVTLNSAALLQRYVRIRYASTTNLRLFVQNSNDFLVIYINKTMKD 602
QY 602 DDLTYQTFDLATTSNMGSGDKNELIIGAESFVSNEXIYIDKIEFIPVQL 652

DB 603 DDLTYQTFDLATTSNMGSGDKNELIIGAESFVSNEXIYIDKIEFIPVQL 653

RESULT 50
ABU09202
ID ABU09202 standard; protein; 653 AA.
XX ABU09202;
AC ABU09202;
XX 12-JUN-2003 (first entry)
DT 12-JUN-2003 (first entry)
XX Bacillus thuringiensis delta endotoxin Cry3Bb1 11231mv2.
DE Cry3Bb1 11231mv2; delta-endotoxin; plant; transgenic; insecticide;
KW crystal 3; Cry3; Coleopteran insect infestation; increased toxicity;
KW season long protection; beetle.
XX Bacillus thuringiensis.
OS Synthetic.
XX US6501009-B1.
PN 31-DEC-2002.
XX 19-AUG-1999; 99US-00377466.
PF 19-AUG-1999; 99US-00377466.
PR 19-AUG-1999; 99US-00377466.
XX (MONS) MONSANTO TECHNOLOGY LLC.
PA Romano CP;
PI WPI: 2003-352192/33.
DR N-PSDB; ABX95189, ABX95190.
XX New modified polynucleotide useful for controlling Coleopteran insect infestation in a field of crop plants encodes insecticidal crystal 3 Bacillus thuringiensis delta-endotoxin.
PT Disclosure; Col 139-142; 107pp; English.
PS The invention relates to a modified polynucleotide which encodes an insecticidal crystal 3 (Cry3) Bacillus thuringiensis delta-endotoxin such as Cry3Bb. The modified polynucleotide is useful for producing a transformed cell, by introducing the modified polynucleotide into a cell such as a plant cell (preferably a maize cell) or a microbial cell. The modified polynucleotide is useful for producing a transformed maize plant by introducing the modified polynucleotide into a maize plant cell, selecting a transformed maize plant cell and regenerating a maize plant from the transformed maize plant cell. A transgenic plant expressing the modified polynucleotide is useful for controlling Coleopteran insect infestation in a field of crop plants. The modified polynucleotide is useful for producing transgenic plants expressing higher levels of the insect controlling B. thuringiensis delta-endotoxin. The modified polynucleotide provides up to 10 fold higher levels of insect controlling delta-endotoxin relative to the highest levels obtained using prior compositions. In particular, transgenic maize expressing higher levels of the Cry3Bb protein designed to exhibit increased toxicity toward Coleopteran pests deliver superior levels of insect protection and are less likely to sponsor development of populations of target insects that are resistant to the insecticidally active protein. Improved control of susceptible target insect pests and season long protection from insect pathogens is achieved using the modified polynucleotide. The modified polynucleotide reduces the number of transgenic events that have to be screened in order to identify one which contains beneficial levels of one or more insect controlling compositions. The present sequence represents the amino acid sequence of Bacillus thuringiensis delta endotoxin Cry3Bb1 11231mv2

XX Sequence 653 AA;
SQ Query Match 99.0%; Score 3373; DB 6; Length 653;
Best Local Similarity 99.2%; Pred. No. 4.4e-274;

Matches		646;	Conservative	2;	Mismatches	3;	Indels	0;	Gaps	0;
Qy	2	NPNRSHDTIKVTPNSELOTHNQYPLADNPSTLEELNKKFLRMTESSSTEVLNST 61								
Db	3	NPNRSHDTIKVTPNSELOTHNQYPLADNPSTLEELNKKFLRMTESSSTEVLNST 62								
Qy	62	KDAVGTGISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 121								
Db	63	KDAVGTGISVVGQILGVGVPPFAGALTSFYQSFLNTIWPSDADPWKAFMAQVEVLIDKK 122								
Qy	122	IEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHPFNS 181								
Db	123	IEEYAKSKALAELOGLQNNFEDYVNALNSWKKTPLSLRSKRSQDRIRELFSQAESHPFNS 182								
Qy	182	MPSFAVSKFEVLFLPTVAQAANTHLALLKDAQVFGGEWGYSSSEDAEFYRRLKLTQOYT 241								
Db	183	MPSFAVSKFEVLFLPTVAQAANTHLALLKDAQVFGGEWGYSSSEDAEFYRRLKLTQOYT 242								
Qy	242	DHCNWNVNGLGRGSTDYDAWKFNFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 301								
Db	243	DHCNWNVNGLGRGSTDYDAWKFNFRREMTLTVLDLIVLFPFYDIRLYSKGVKTELT 302								
Qy	302	RDIPTDPIFSLNLOEYGPFTLSIENSIRKPHLFDYLOQIEFHTRLQPGYFGKDSFNYS 361								
Db	303	RDIPTDPIFSLNLOEYGPFTLSIENSIRKPHLFDYLOQIEFHTRLQPGYFGKDSFNYS 362								
Qy	362	GNVETRPSIGSSKTIITSPYGDKSTEPVOKLSFDGQKVYRTIANTDVAAPNGKVYLG 421								
Db	363	GNVETRPSIGSSKTIITSPYGDKSTEPVOKLSFDGQKVYRTIANTDVAAPNGKVYLG 422								
Qy	422	TKVDFSQYDDQKNETSTQTYDSKRNNGHVSQAQDSIDQLPETTTDEPLEKAYSHQLNYAEC 481								
Db	423	TKVDFSQYDDQKNETSTQTYDSKRNNGHVSQAQDSIDQLPETTTDEPLEKAYSHQLNYAEC 482								
Qy	482	FLMQDRRGTIIPFTWTHRSVDFPNTIDAEEKITQLPVVKAYALSSGASIIIEGPGFTGNNLL 541								
Db	483	FLMQDRRGTIIPFTWTHRSVDFPNTIDAEEKITQLPVVKAYALSSGASIIIEGPGFTGNNLL 542								
Qy	542	FLKESNSIAKFKVTLSAALLQRYRIRIYASTTNLRLFVQNSNNDFLVIYINKTMNKD 601								
Db	543	FLKESNSIAKFKVTLSAALLQRYRIRIYASTTNLRLFVQNSNNDFLVIYINKTMNKD 602								
Qy	602	DDLTYQTFDLATTNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 652								
Db	603	DDLTYQTFDLATTNSNMFGSGDKNELIIGAESFVSNEKIYIDKIEFIPVOL 653								

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Job time : 181 secs

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